



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

The diachrony of Mapudungun stress assignment

Citation for published version:

Molineaux Ressa, B 2017, 'The diachrony of Mapudungun stress assignment', *Papers in Historical Phonology*, vol. 2, pp. 1- 50. <https://doi.org/10.2218/pihph.2.2017.1846>

Digital Object Identifier (DOI):

[10.2218/pihph.2.2017.1846](https://doi.org/10.2218/pihph.2.2017.1846)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Publisher's PDF, also known as Version of record

Published In:

Papers in Historical Phonology

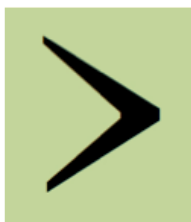
General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.





The diachrony of Mapudungun stress assignment

BENJAMIN J. MOLINEAUX

The University of Edinburgh

Abstract

Stress assignment is one of the most widely-known and controversial aspects of present-day Mapudungun (aka Araucanian) phonology. Here, the diachrony of the phenomenon is explored based on the available written record spanning 1606–1936. Having surveyed these sparse but suggestive data, and contrasted them with present-day evidence, we suggest four distinct stages of development. Ultimately, we go on to argue that Mapudungun has undergone changes both to the morphological and metrical domains which determine stress assignment. At the level of the morphology, stress appears to have changed from marking the edge of verbal roots, to marking the edge of stems. In terms of metrical units, the apparent lack of weight-sensitivity in the earliest stages of the language is replaced by a decidedly weight-sensitive system towards the end. Finally, it is argued that stress assignment in Mapudungun is subordinate to morpho-phonological transparency both synchronically and diachronically, allowing the position of stress to vary in order to highlight the morphology.

Mapudungun, the ancestral language of the Mapuche people of south-central Chile and Argentina, has a recorded history of just over four centuries. As with most languages of the Americas, the diachronic dimension of Mapudungun has attracted only limited attention, much to the detriment of our understanding of the history of the language and region, as well as to that of the typology of language change as a whole. As we shall see, although the record is somewhat patchy and often difficult to interpret, it contains enough data in order to suggest an account of at least some features of previous stages of the language, and propose a path of development into the present day.

In this paper our focus is on stress, for which Mapudungun is well known in the typological literature, albeit under the exonym ‘Araucanian’. Based on a single article, Echeverría & Contreras (1965), virtually all major theoretical accounts of stress assignment include Mapudungun as a

potential case for the existence of quantity-insensitive iambs (cf. Hyman 1977: 41-2, Kager 1993: 409, 2007: 205-6, Hung 1993: 177-80, 1994, Kenstowicz 1994: 556, Hayes 1995: 266, Gordon 2002: 522, 2011: 143 Hyde 2002, 2011: 1055-65, McGarrity 2003: 59-61, Tesar 2004: 220-21, Hermans 2011: 982-984, Goedemans, Heinz & van der Hulst 2014, Martínez-Paricio & Kager 2015). Crucially, this initial description has been shown to be empirically suspect (de Lacy 2014); to be at odds with most other descriptions of present-day Mapudungun (cf. Echeverría 1964, Salas 1976, 1992, Catrileo 1995, Zúñiga 2006b, Smeets 2008, Sadowsky et al. 2013, Molineaux 2014); and to fail to address the interaction of stress and morphology (cf. Augusta 1903, Echeverría 1964, Molineaux 2014, 2016b).

The data we survey are substantially different from those available for Indo-European languages, where historical depth and close genetic affiliation allow for a broader view of the phenomena in context. Our knowledge of Mapudungun, in contrast, begins only in 1606, and for lack of conclusive evidence, the language is deemed an isolate¹. Furthermore, as no written record exists of the language prior to European arrival, and writing has only recently become more widespread amongst some native speakers, the older Mapudungun records we have are all provided by non-native speakers (predominantly missionaries). Finally, as no truly consistent marking of stress is given in the available sources (it seems clear that it was never phonemic), and no major synchronic or diachronic stress-related alternations have been put forth, we must rely mostly on explicit descriptions of stress given in grammars.

Of course, these type of data are less than ideal. Although some of the early grammars show careful exemplification and details as to contextual variation in the position of stress, others give little or no examples whatsoever. While some give explicit stress rules for specific items and categories, others are extremely broad, omitting forms that are known to display idiosyncratic behaviour in the Present-Day Mapudungun (PDM) data, as well as in other grammars.

¹ Proposed genetic affiliations range from near-neighbours to the north — such as Quechua, Aymara (Englert de Dillingen 1936) and Pano-Tacanan (Loos 1973, Key 1978, 1981) — and to the south — Kawésqar, Yaghan and Chon (Tierra del Fuego, now extinct, see Greenberg 1978, Key 1981) — as well as membership in more distant families such as Arawakan (Payne 1984, Croese 1989, 1991, Díaz-Fernández 2011), Mayan (Stark 1970, but see Hamp 1971, Campbell 1997: 207), or Aztec and Uto-Aztecan (Key 1981).

To further complicate matters, we survey not only stress, but also its relation to morphological structure. Unfortunately, the early grammars of the language — from the turn of the seventeenth century to the beginning of the twentieth — are not uniform in terms of the theoretical framework in which they were written and, consequently, in the segmentation and mapping of morphemes to meaning. Once the grammars' claims have been carefully reviewed, we attempt to find a common framework for referring to morphological structure and rules of stress assignment.

We argue that the basic pattern for Mapudungun stress assignment is best viewed in nouns, which are by and large, monomorphemic. Although we begin with such simplex words, we move on to morphologically complex ones, examining the main locus of both inflection and derivation: the verb, which in Mapudungun is both polysynthetic and highly agglutinating. In particular, we look into intransitive forms of the three well-described moods of Mapudungun: indicative, subjunctive and imperative.² This is done since their semantics are generally agreed upon, evidence is provided for them in all the grammars, and it has been claimed that their morphological structure itself has undergone practically no change in the recorded history (Salas 1991). Such forms, it will be claimed, set forth a fairly reliable overview of the evolution of the language's stress system, which will be complemented — where available — with additional evidence from further inflectional and derivational morphology of the verb, and ultimately with evidence from nominal compounds as well.

As a result of the non-trivial limitations in the historical data, our analysis is speculative in nature. After presenting an overview of PDM stress and morphological structure (§1), we move from the earliest and sparsest data (Valdivia 1606, §2.1), to progressively more contemporary-like accounts (Havestadt 1777, Febrés 1765, §2.2 Lenz 1895-1897, Augusta 1903 §2.3), attempting to reconstruct specific synchronic stages. This done, we try to establish the diachronic path from one system to the next, putting forth some of the possible motivations for change and preservation of morphological and prosodic structure (§3). Here, the role of the learner is emphasised in creating patterns on the basis of both probabilistic and categorical data in the input.

² Earlier grammars (Valdivia 1606, Havestadt 1777, Febrés 1765) also include the optative and infinitives as moods.

1 Present-Day Mapudungun and the stress literature

Although there are important differences in the primary data on placement of stress in PDM, accounts agree on the non-contrastive nature of the phenomenon, as well as its general ‘weakness’ and the tendency for stress to shift position (especially in vowel-final disyllables). Crucially, there are no clear phonological patterns conditioned by stress. Potential candidates, such as vowel neutralisation or deletion in unstressed syllables, are shown either to have no empirical basis (cf. Sadowsky et al. 2013: for unstressed vowel inventories) or to have alternative, more parsimonious analyses (cf. Molineaux 2014: §1.2.1.2 and below for epenthesis vs. vowel deletion).

While the Mapudungun-specific literature on stress presents some minor discrepancies, the predominant view tends to consider stress as trochaic (cf. Suárez 1959, Salas 2006, Zúñiga 2006b, Sadowsky et al. 2013, Molineaux 2014). Based on Echeverría & Contreras (1965), on the other hand, typological studies take Mapudungun to be iambic (cf. Hyman 1977, Kager 1993, Hayes 1995, Gordon 2002, Tesar 2004, Martínez-Paricio & Kager 2015). As a matter of fact, language-specific and typological approaches tend to differ in all basic parameters for stress assignment (cf. Table 1).

	FOOT	WEIGHT	DIRECTION	ITERATION
LANGUAGE-SPECIFIC	Trochaic	Sensitive	Right-Left	No
TYPOLOGICAL	Iambic	Insensitive	Left-Right	Yes

Table 1: Two competing accounts of stress placement in Mapudungun

As bizarre as this misalignment may seem, it is our claim that the main differences in these analyses can be explained by taking into account the brevity of most simplex words, and the morphological boundaries of the more complex ones. The baseline for doing so, as we have hinted already, may be established by examining nouns, which rarely present any complex morphology whatsoever, and so need not correspond to more than a single layer for stress assignment.

1.1 Morphologically simplex nouns in PDM

A representative sample of, di- and trisyllables and their relevant stress patterns (from Molineaux 2014) are presented in (1) and (2).

(1) Stress-placement in PDM monomorphemic nouns

- | | | | |
|-----------------|------------------|-------------------|----------------|
| a. [na.ᵐᵐn] | ‘foot’ | b. [lʔaf.ʔkenʔ] | ‘sea’ |
| c. [wa.ŋi.ʔlen] | ‘star’ | d. [a.tʔʔuʔ.ʔpeʔ] | ‘floating ash’ |
| e. [ma.ʔwi.θa] | ‘woodland’ | f. [puʔ.ʔpu.ja] | ‘armpit’ |
| g. [pi.ʔfʔʔ.ka] | ‘two-tone flute’ | | |

Leaving aside the data for disyllables ending in a vowel (2), we note that final closed syllables are uniformly stressed (1a–d). Where there is no final closed syllable, the penult (1e–g) bears stress. This first approximation points strongly to a weight-sensitive system, or more specifically to a right-aligned moraic trochee as the basic foot structure of Mapudungun nouns.³ This said, compared to the left-aligned quantity insensitive iambic analysis, only trisyllables ending in a closed syllable (1c–d) — a relatively uncommon type of monomorpheme — present a challenge.

(2) Stress-placement in PDM vowel-final disyllables

- | | |
|----------------------------|---------|
| a. [ʔma.pu] ~ [ma.ʔpu] | ‘land’ |
| b. [ʔpiw.ke.] ~ [piw.ʔke.] | ‘heart’ |

The vowel-final disyllables exemplified in (2) alternate the position of stress, such that it sometimes fits the quantity insensitive iambic analysis, and sometimes the quantity sensitive trochaic one. This pattern is identified by virtually all present day accounts, with the general consensus that stress falls on the penult more frequently than on the final. It is also reported that penultimate stress is judged by speakers as “more correct” than the alternative, and may thus be register-bound. Finally, the placement of stress seems not to be governed by the word’s position in the phrase or utterance, but fluctuates relatively free of conditions (Molineaux 2014, 2016a). This fluctuation in nouns is not attested for adjectives, adverbs or pronouns, which have final stress irrespective of the final syllable’s weight (cf. [pi.ʔtʔʔi] ‘small’, [wu.ʔle] ‘tomorrow’, [iʔ.ʔtʔʔe] ‘I/me’).

³ Following Hayes (1995): Moraic Trochee: (L L) or (H L) and sometimes (L), where ‘L’ = a light syllable, ‘H’ = a heavy syllable, and underlining represents the position of stress. Quantity-insensitive iambs: (σ σ), where σ = any syllable. This second foot type, however is explicitly banned in the Hayesian model (Hayes interprets Mapudungun as a defective quantity sensitive iambic system, where weight-by-position plays no role — 1995: 266–268).

1.2 Multi-suffix verbs in PDM

While speakers have no intuitions for the existence of more than one stress in monomorphemes, complex words are often deemed to have two stresses. However, subjects tend to be uninformative as to the hierarchical organisation of the stresses (Molineaux 2014, 2016b). In a number of accounts (Salas 2006: 74, Zúñiga 2006b: 64, Smeets 2008: 49), two windows for stress assignment are proposed for "longer words", one at the right edge, and one at the left. As we see in the examples in (3), at the right, the pattern is basically, final if closed, otherwise penult. At the left, a window of two syllables is suggested, though there is little agreement as to the pattern it follows.

(3) Stress-placement in PDM verbs (from Molineaux 2014, R=root; ω =word)⁴

- | | |
|--|---|
| a. [[θew.ʔma.] _R -ka.-ʔki-j] _ω
make-CONT-HAB-IND.3S
's/he is usually making' | b. [[ʔ.ʔʔʔʔʔʔf.] _R -tu.-pu.-ke.ʔla-j.-m-i] _ω
throw-REST-TRLOC-HAB-NEG-IND-2-S
'You don't usually throw x back here' |
| c. [[ʔlef.] _R -pu.ʔle-j] _ω
run-TRLOC-PROG-IND.3
's/he is running here' | d. [[ʔʔʔi.ʔpa.] _R -ke.ʔla-n.-m-i] _ω
exit-HABIT-NEG-IND-1S
'I don't usually go out' |

A quick look at the examples in (3) shows right-edge stress to fall consistently on the final pre-consonantal vowel, in the general weight-sensitive, trochaic pattern we identified for nouns. In the case of the left-edge, the pattern would be difficult to ascertain, were it not for the indication of the verbal root in brackets. Consistently, it is the final syllable of the root that takes stress, irrespective of weight considerations. As verbal roots tend to be disyllabic, with occasional monosyllables (cf. 3c), it is unsurprising that Echeverría & Contreras (1965) describe a quantity-insensitive iambic system at the left edge, a pattern that also aligns with adjectives, adverbs and pronouns.

There are still a couple important wrinkles in this description, however. Firstly, there is a small category of fairly productive valency-changing suffixes which tends to bear stress (cf. 4). Due to their core

⁴ The following glossing conventions are used in this paper, mostly after Zúñiga (2006b) and Smeets (2008): APPL: applicative, BI: broken implicature (see Soto & Hasler 2010), CAUSE: causative, CIS: cislocative, CONT: continuative, D: dual, DES: desiderative, DET: determiner, EP: epenthetic, FP: focal person, FUT: future, HAB: habitual, IND: indicative, INV: inverse, IMP: imperative, NEG: negative, NMLS: nominaliser, PASS: passive, P: plural, PROG: progressive, POST: postposition, REST: restorative, SP: satellite person, S: singular, SUBJ: subjunctive, TEMP: temporal, TRLOC: translocative.

semantics, their immediate adjacency to the root, and their ability to induce root-allomorphy (cf. Molineaux 2014: 161-2), these suffixes may be treated, together with the verbal root, as an extended verbal stem. This, in turn, may be the broadest domain for the realisation of left-edge stress, which we now may more properly term stem stress.

(4) Sample valency-changing (stem-extending) suffixes in PDM (R=root, S=stem, ω =word):

- a. [[tu.ku.]_R-ne.]_S-la.-fu-j] _{ω} ‘place-PASS-NEG-BI-IND.3S’
- b. [[la.n]_R-m.]_S-ke-fi-j] _{ω} ‘die-CAUSE-HAB-DIR.3SP-IND.3S’
- c. [[[pe]_R-ma.]_S-la-fi-j] _{ω} ‘see-APPL-NEG-DIR.3SP-IND.3S’

The second issue to account for in the verb-stress data is that of clash arising from the adjacency of stem and right-edge stress domains. Although occasionally clash is tolerated, the default pattern — as seen in the examples in (5) — seems to be the demotion of stress on simple stems (stem=root) and the promotion of that which falls on complex stems (stem= root+suffix).

(5) Stress realisation in PDM verbs where left- (stem) and right-edge stress clash is predicted, from Molineaux (2014):

- | | |
|---|--|
| <ul style="list-style-type: none"> a. [[e.lu.-<u>ma</u>.]_S-fi-j.-m-i]_{ω}
give-APPL-3.SP-IND-2-S
‘You give him/her/it x’ c. [[l<u>a</u>.<u>n</u>]-<u>m</u>.]_S-fi-j]_{ω}
die-CAUSE-3.SP-IND.3S
‘s/he kills him/her/it’ | <ul style="list-style-type: none"> b. [[le.li.]_S-<u>fi-j</u>.-m-i]_{ω}
watch-3.SP-IND-2-S
‘you watch him/her/it’ b. [[le.li.]_S-<u>fi-j</u>.]_{ω}
watch-3.SP-IND.3S
‘s/he watches him/her/it’ |
|---|--|

Although there may be a number of ways of establishing the basic prosodic units and processes leading to stress positioning in PDM verbs (see, for instance, the proposals in Molineaux 2014), it is clear that there is a place for the moraic trochee in the system, as well as for morphological structure playing a fundamental role. As we shall see in the following section, these traits are not limited to the verbal system.

1.3 Nominal compounds in PDM

Suffixation is comparatively rare for nouns in Mapudungun, still the concatenation of free nominal stems — compounding — is highly productive. A peculiarity of this word-building process in the language is that it displays both head-initial and head-final forms (cf. Baker & Fasola 2009: 598).

(6) Head-final and head-initial PDM nominal compounds (H=head, D=dependant) from Molineaux (2014):

- a. [tʰa.fo]_D-[ku.ʔʔʔʔan]_H b. [tʰa.ʔnu]_H-[nʔa.mun]_D
 ‘cough-disease’(a cold) ‘finger-foot’(toe)
 c. [ku.θi]_D-[ʔfo.ro]_H d. [fo.ʔro]_H-[ʔʔʔa.wa]_D
 ‘mortar-bone’(spine) ‘bone-fish’(fishbone)

Note that in the examples in (6a,b) the stress system seems to follow what we find in the verbal system: stress falls on the final closed syllable of the word (a right aligned moraic trochee), as well as on the final syllable of the first root-element, irrespective of weight. For cases where these patterns would predict stresses clash — (6c,d) —, the compounds reveal a new pattern in the data: the head of the compound preserves stress in clash, while the morphologically dependant stem lacks stress altogether.

1.4 The Obligatory Finite Inflection (OFI) and stress in PDM

Given that early descriptions of Mapudungun focus primarily on the verbal system and its morphological complexity, this is also where we find the most reliable body of data on stress placement, outside simplex words. As it is consistently described in most of the historical sources, we focus on what has been termed the ‘obligatory finite inflection’ (OFI, Salas 1992) — the three rightmost slots in the language’s complex agglutinating verbal morphology, marking mood, person, and number,⁵ all of which are obligatory for finite verbs.

ROOT	MOOD	PERSON	NUMBER
ʔʔʔipa	-l	-m	-u
‘exit’	SUBJ	2	D

Table 2: Example OFI (mood, focal person and number marking) in contemporary Mapudungun

Considering the mostly agglutinating nature of the language, port-manteau morphemes are thought to be the exception (cf. Rivano 1989:

⁵ Mapudungun has an inverse person-marking system where verbal arguments refer to focal and peripheral persons. In intransitive verbs, the agent is the focal person. In transitive verbs, either argument might be the agent or the patient. In such cases, the default is for the focal person to be the agent. Where there is inverse marking, however, the peripheral person becomes the agent (cf. Salas 1976, 2006, Baker 2003).

150). However, the first person singular indicative /-(ɲ)n/ and the singular forms of the imperative, /-tɲɲi/, /-ɲe/, and /-pe/ (1st, 2nd and 3rd person, respectively) seem to be undecomposable. Excluding these morphemes, it is easy to assume that distinct meanings in the paradigms of verbs should be represented by separate morphemes at the underlying level — which is precisely what most accounts do. The language, therefore, appears to have little in the way of allomorphy,⁶ but does display some regular phonological alternations that may somewhat obscure the agglutinating pattern. The overall ‘one-morpheme, one meaning’ system for mood, focal person and number can be summarised as follows, according to Salas (1992), Zúñiga (2006b) and Molineaux (2014):

	IND	SUBJ	IMP
Mood	/-i/	/-(ɲ)l/	/-∅/
	1	2	3
Person	/-i/	/-m/	/-∅/
	S	D	P
Number	/-i/	/-u/	/-n/

Table 3: Mood, focal person and number markers in Mapudungun

A number of alternations in the syllabic makeup of PDM verbs, which affect stress placement, are produced by (a) the alternation between syllabic and non-syllabic high-front sonorants ([i~j] marking the indicative, first person or singular), (b) the deletion of these same segments, and (c) the insertion of epenthetic [ɲ] to break up consonantal clusters. A cursory statement of the key patterns at play in the inflectional system is given in (7)⁷, while tables 4 and 5, based on Salas (1991, 1992), Zúñiga (2006b), and Molineaux (2014), make the surface alternations plain.⁸

⁶ Key exception to this are the portmanteau morpheme /n~/ɲn/ ‘IND.1.S’ and non-portmanteau /l~/ɲl/ ‘SUBJ’.

⁷ See Rivano (1990) and Molineaux (2014) for formal treatments of these patterns.

⁸ Two of the patterns that are not immediately straightforward in the tables are those of the final [e] in the subjunctive third person, and final [-li] in the subjunctive, first person singular. While Mapudungun tends not to distinguish number in the third person, it can be disambiguated, where necessary, by a postposed pronoun — [eɲu] for the dual, [eɲɲn] for the plural. In the indicative, the reduced, fused forms of the pronoun are [ɲu] and [ɲɲn], following final [i~j], which leads us to believe that, in the subjunctive plural forms, the pronouns’ initial [e] was reanalysed as part of the OFI, thus extending to all persons. As for the subjunctive first singular (/l-i-i/) surfacing as [-li], rather

(7) Key phonological processes governing the OFI in PDM

- Glide formation: /i/ becomes [j] following a vowel, except where it would create a word-final final cluster. (e.g. /kon-i-i-u/[ko.ni.ju], but /ʔʔʔʔipa-ʔ-i-ʔ/[ʔʔʔʔi.pa.iʔ]-*[ʔʔʔʔi.pajʔ])
- High-front sonorant deletion: /j/ is deleted in tautosyllabic series with /i/. (e.g. /ʔʔʔʔi.pa.-i-i-ʔ/[ʔʔʔʔi.pa.iʔ])
- Epenthesis: [ʔ]-inserted to break up tautosyllabic consonantal series (e.g. /kon-ʔ-m-n/[kon.mʔn])
- n-palatalisation: /n/ becomes [ɲ] following a high front vowel (e.g. /kon-ʔ-i-n/[ko.niʔ])

		1 st	2 nd	3 rd
IND	S	[ʔʔʔʔi.ʔpa-n]	[ʔʔʔʔi.ʔpa-j.mi]	[ʔʔʔʔi.ʔpa-j]
	D	[ʔʔʔʔi.ʔpa.-ju]	[ʔʔʔʔi.ʔpa-j.mu]	"
	P	[ʔʔʔʔi.pa.-ʔiʔ]	[ʔʔʔʔi.ʔpa-j.mʔn]	"
SUBJ	S	[ʔʔʔʔi.ʔpa.-li]	[ʔʔʔʔi.ʔpa-l.mi]	[ʔʔʔʔi.ʔpa.-le]
	D	[ʔʔʔʔi.ʔpa.-lju]	[ʔʔʔʔi.ʔpa-l.mu]	"
	P	[ʔʔʔʔi.pa.-ʔliʔ]	[ʔʔʔʔi.ʔpa-l.mʔn]	"
IMP	S	[ʔʔʔʔi.ʔpa.-tʔʔʔi]	[ʔʔʔʔi.ʔpa.-ɲe]	[ʔʔʔʔi.ʔpa.pe]
	D	[ʔʔʔʔi.ʔpa.-ju]	[ʔʔʔʔi.ʔpa.-mu]	"
	P	[ʔʔʔʔi.pa.-ʔiʔ]	[ʔʔʔʔi.ʔpa.-mʔn]	"

Table 4: PDM verbal paradigm for the vowel-final root [ʔʔʔʔipa-] ‘exit’

An important analytical difference must be made between [ʔ] in the final syllable of all forms of the second person plural and [ʔ] in the vowel-initial allomorphs of the subjunctive marker /-ʔl/ and the indicative 1st singular marker /-ʔn/ (see Table 5).⁹ In the first case, the vowel is never stressed, and in the second cases, it usually is. As epenthetic [ʔ] is well attested elsewhere in Mapudungun, we assume that the unstressed forms are, indeed, epenthetic vowels added after stress assignment, while stressed [ʔ] is part of the underlying allomorph of the relevant suffixes.

than expected *[-lij] (compare ind.3 /i-i/[ij]), we can only suggest that the homorganic vowel-glide sequence was historically reanalysed as a single vowel in the less-frequent subjunctive, while being maintained in the more frequent indicative form.

⁹ The vowel-initial allomorph appears to be selected in inter-consonantal position, and in word-final position following a consonant (i.e., where /-l/ would create a consonant cluster).

		1 st	2 nd	3 rd
IND	S	[ko.ʔn-ʔn]	[ko.ʔn-i.mi]	[ko.ʔn-ij]
	D	[ko.ʔn-i.ju]	[ko.ʔn-i.mu]	"
	P	[ko.ʔniʔ]	[ko.ʔn-i.mʔn]	"
SUBJ	S	[ʔkon-.li]	[ko.ʔn-ʔl.mi]	[ʔkon-.le]
	D	[ʔkon-.lju]	[ko.ʔn-ʔl.mu]	"
	P	[kon-.ʔliʔ]	[ko.ʔn-ʔl.mʔn]	"
IMP	S	[ʔkon-.tʔʔi]	[ʔkon-.ɲe]	[ʔkon-.pe]
	D	[ʔkon-.ju]	[ʔkon-.mu]	"
	P	[kon-.ʔiʔ]	[ʔkon-.mʔn]	"

Table 5: PDM verbal paradigm for the consonant-final root [kon-] ‘enter’

Most importantly we note that, given the caveats above, minimal inflectional patterns in PDM follow the general stress pattern established for multi-suffix verbs. As a right-aligned trochee would either overlap or clash with stem-final stress in OFI-only verbs, only the trochaic pattern is consistently visible. Note that, while in vowel-final roots, most forms of the verb display an overlap between the two potential locations for stress, in consonant-final ones, stress is more often assigned to a vowel belonging to the inflectional material, rather than the root.

1.5 Summary for stress in PDM

As we have seen, then, the stress pattern for PDM nouns is predominantly a right aligned moraic trochee. In the case of adjectives, adverbs and pronouns, the pattern is stress-final. More interestingly, the stress system of compounds and verbs, though a right-aligned moraic trochee at the word-level, seems to establish a hierarchy of stress-placement that makes reference to several levels of morphological structure. Even though we have mentioned that stress is somewhat ‘weak’ phonetically, and that it has little interaction with the phonological system overall, we can also see (as claimed in Molineaux 2014, 2016b) that it plays an important role in highlighting — demarcating — the morphological structure of this highly agglutinating language.

Given stress on the first element of compounds, it is unsurprising that adjectives, which by and large precede a noun, have final stress. This position, as we have seen, appears to be typical of stem demarca-

tion processes, which may affect the adjective+noun phrase as it does a noun+noun compound.

Lack of agreement in previous work on the language, in our view, is unsurprising, as the ultimate system for stress assignment is not only layered, but also allows for a fair amount of variability. The pervasiveness of such features begs the question as to the stability of the system overall and the origins of its idiosyncrasies. In the following sections we also attempt to situate these changes within a more general typology of prosodic change and evaluate the incidence of language internal and contact phenomena therein.

2 Evidence for the history of Mapudungun stress assignment: 1606–1903

In the following sections we will take a detailed look at the data for historical Mapudungun stress, and trace its path to the present-day language. We divide the historical attestations into three stages, to which we add the contemporary data as a fourth stage (cf. Table 6). The presentation of the data in such documentation is not homogenous, either in its form, in its theoretical outlook, its depth of exemplification, or in its actual description of the language. However, there is no doubt that all the works deal with closely related varieties of a single language, and that it should be possible to trace a diachronic path from one stage to another.

Stage	Period	Sources
Stage I	Early 17 th century	Valdivia (1606),
Stage II	Mid 18 th century	Havestadt (1777), Febrés (1765)
Stage III	Late 19 th / Early 20 th century	Lenz (1893, 1895-1897), Augusta (1903, 1910, 1916)
Stage IV	Late 20 th / Early 21 st century	Salas (1976, 1992), Molineaux (2014, 2016a)

Table 6: Documented synchronic stages for Mapudungun

2.1 Stage I: *Luis de Valdivia (1606) and the turn of the seventeenth century*

The earliest extant description of Mapudungun is Spanish-Jesuit Luis de Valdivia's *Art and Grammar* of the language, first published in Lima in 1606. The work was the result of Valdivia's almost 15 years in the Mapuche territories, learning and preaching in the language (see Olivares 2005, Toribio Medina 1894). Meant as a missionary learner's-guide, the grammar was written in the traditional, scholastic model of the day. Needless to say, this type of description was rather inadequate for a language

so typologically dissimilar from Latin, its prototype. All in all, however, Valdivia did innovate a reasonable amount, creating a range of new categories to deal with his recalcitrant data (cf. Zwartjes 2000). Abstracting away from its theoretical framework, the grammar is very thorough and generally considered a fair description of the language, especially as regards phonology and verbal morphology (see Zwartjes 2000: 205-6, Salas 2003: 7, but also Lenz 1895-1897: 16).

2.1.1 Stress assignment, Valdivia (1606)

The stress assignment system for the language is given in the final section of Valdivia's grammar (1606: 74-5). Unfortunately, the rules are extremely parsimonious, no concrete examples are given, and there is no stress marking in the texts or examples elsewhere in his grammar or in the 'Sermons' published later (Valdivia 1621). Although we are told that there are a number of exceptions, the stress system is summed up by three basic rules:¹⁰

(8) Rules for stress assignment, Valdivia (1606: 74-5)

- *Rule 1* All nouns, prepositions, conjunctions, adjectives, adverbs, participles and interjections tend to be stressed on the penultimate syllable.
- *Rule 2* For verbs in the indicative, stress is on the final syllable for the first person; in verbs in the subjunctive, the first person is stressed on the penultimate syllable. For the other persons stress falls on the same syllable as the first person.
- *Rule 3* In the imperative, stress is on the penultimate syllable of the first singular dual and plural, as well as in the dual of the second and third person, but on the final syllable in the second and third person singular and plural. In transitions¹¹, stress is on the *-e* or *-mo* that marks them.

¹⁰ Here, as in the other sources of early Mapudungun, I have provided close paraphrases — not direct translations — of the original Spanish, Latin or German, in order to smooth over some of the idiosyncrasies of the theoretical frameworks and style of the authors. Throughout the early grammars, I have tried not to make matters more difficult for the reader by presenting the transcription system of the authors in detail. Instead, I have tried to equate the elements being transcribed to the forms I use in the PDM data.

¹¹ Valdivia, as well as most early grammarians of Mapudungun use the term 'transitions' to refer to the inverse verbal morphology of the language (Adelaar 1997, Zwartjes 2000).

If these rules are truly representative of the distribution of Mapudungun stress at the turn of the seventeenth century, they present an important departure from what we find in our own, contemporary data. We take a look at the different word categories and attempt to reconstruct their actual patterns, accounting for their distribution.

2.1.2 Nominal and adjectival stress

The difference between present-day and turn-of-the-seventeenth-century stress is immediately evident in the case of the nominal and adjectival system. Recall that PDM was claimed to have penultimate mora stress in nouns, while adjectives (as well as adverbs and pronouns) had final stress. Here, nevertheless, we find only one system, which fits neither of these patterns: stress is on the penultimate syllable, regardless, apparently, of weight considerations.

(9) Early 17c stress in nouns and adjectives, after Valdivia (1606)

- | | | | |
|------------------|-------------|---------------|----------|
| a. [ʔma.pu] | ‘land’ | b. [ʔvu.ta] | ‘big’ |
| c. [ʔwin.ka] | ‘foreigner’ | d. [ʔmiʔ.ki] | ‘sweet’ |
| e. [ʔli.kan] | ‘crystal’ | f. [ʔko.ʔoʔ] | ‘purple’ |
| g. [ʔlʔaf.kenʔ] | ‘sea’ | h. [ʔmon.koʔ] | ‘round’ |
| i. [ma.ʔwi.θa] | ‘woodland’ | | |
| k. [a.ʔʔʔʔa.waʔ] | ‘hen’ | | |

If Rule 1 is accurate, at least from a surface perspective, the system appears to be trochaic and quantity insensitive (i.e. a syllabic trochee, in the sense of Hayes 1995). This, of course, is at odds with the moraic system outlined in §1.1 for contemporary central Mapudungun nouns, as well as with the alternations we find in the perception of stress in light-final disyllables (Molineaux 2016a). The system also contradicts the PDM tendency for adjectives, adverbs and pronouns to be stressed on the final syllable, regardless of weight.

2.1.3 Verbal stress

Rules 2 and 3 in (8) present a picture of verbal stress that is fundamentally determined by morphological structure, rather than by the phonology of the language. Stress appears to be a feature of the inflectional paradigms,

These forms imply a reversal of the agency relations of transitive verbs, where the satellite person becomes the agent, rather than the focal person. See fn. 5.

rather than an algorithm that must be computed online for each form. As the first person singular of the indicative is [-n] and that of the subjunctive, [-li], stress will always surface on the vowel immediately preceding mood-marking (i.e. a final syllable closed by [-n] or a penultimate syllable, followed by [-li]). The vast majority of the imperative paradigm is also stressed on the vowel preceding mood-marking: here, the root-final vowel. The key exceptions are the portmanteau morphemes marking the second and third person singular, which take stress, even if they are the final syllable. Assuming Valdivia's rules and with the rudiments of Mapudungun verbal structure outlined above, we may reconstruct early seventeenth century verbal stress for vowel-final roots, as in Table 7.

		1 st	2 nd	3 rd
IND	S	[ʔʔʔi.pa-n]	[ʔʔʔi.pa-j.mi]	[ʔʔʔi.pa-j]
	D	[ʔʔʔi.pa-ju]	[ʔʔʔi.pa-j.mu]	"
	P	[ʔʔʔi.pa-iʔ]	[ʔʔʔi.pa-j.mn]	"
SUBJ	S	[ʔʔʔi.pa-li]	[ʔʔʔi.pa-l.mi]	[ʔʔʔi.pa-le]
	D	[ʔʔʔi.pa-lju]	[ʔʔʔi.pa-l.mu]	"
	P	[ʔʔʔi.pa-liʔ]	[ʔʔʔi.pa-l.mn]	"
IMP	S	[ʔʔʔi.pa-tʔʔi]	[ʔʔʔi.pa-ʔɲe]	[ʔʔʔi.pa.ʔpe]
	D	[ʔʔʔi.pa-ju]	[ʔʔʔi.pa-mu]	"
	P	[ʔʔʔi.pa-iʔ]	[ʔʔʔi.pa-mn]	"

Table 7: Verbal paradigm for consonant-final root [ʔʔʔipa-] 'exit', after Valdivia (1606).

Although Valdivia does not deal with the issue of consonant-final versus vowel-final roots, the data he provides in the *Vocabulary and Confessionary* that close his grammar, and his *Sermons* (Valdivia 1621), point to a series of verbs with epenthetic ⟨i⟩ breaking up consonantal clusters at the root/inflection boundary, as in (10).

- (10) Post-root, semantically empty ⟨i⟩ in Valdivia (1606, 1621)
- | | |
|-----------------|------------------|
| a. ⟨kim-i-n⟩ | b. ⟨kim-i-l-m-n⟩ |
| know-EP-IND.1.S | know-EP-SUBJ-2-P |

Valdivia appears to be somewhat inconsistent in his use of the epenthetic form (cf. ⟨elu-duam-n⟩ 'give-DES-IND.1S' 1606: 14) making it an unlikely candidate for stress. We will therefore assume that, in the case of consonant-final roots (that show the ⟨i⟩ ~ ∅ alternation), said vowel

(assumed here to be [ɐ]) is disregarded for stress assignment purposes. Ultimately, this means that Rule 2 in (8) places stress on the final syllable of the verbal root, excepting the imperatives [-ɲe] and [-pe], as shown in Table 8.

		1 st	2 nd	3 rd
IND	S	[ɛko.n-ɐn]	[ɛko.n-i.mi]	[ɛko.n-ij]
	D	[ɛko.n-i.ju]	[ɛko.n-i.mu]	"
	P	[ɛko.n-iɐ]	[ɛko.n-i.mn]	"
SUBJ	S	[ɛkon-.li]	[ɛko.n-ɐl.mi]	[ɛkon-.le]
	D	[ɛkon-.lju]	[ɛko.n-ɐl.mu]	"
	P	[ɛkon-.liɐ]	[ɛko.n-ɐl.mn]	"
IMP	S	[ɛkon-.tɛɐi]	[kon-.ɲe]	[kon-.pe]
	D	[ɛko.n-ju]	[ɛkon-.mu]	"
	P	[ɛko.n-iɐ]	[ɛkon-.mn]	"

Table 8: Verbal paradigm for the consonant-final root [kon-] ‘enter’ in Valdivia (1606)

Nevertheless, the rules seem to imply that the addition of tense or aspect suffixes changes the placement of stress, as in (11), thus requiring a new analysis.

(11) Stress in further inflected verbs, following Valdivia (1606):

- a. [e.lu.-ɐbu-n] b. [kim.-du.ɐa.m-ɐl-m-n] c. [kon.-ɐla-n]
 give-BI-IND.1S know-DES-EP-SUBJ-2-P enter-NEG-IND.1S

We may then consider stress as a stem phenomenon, where the stem would include the root and the tense and aspect marking, excluding mood, person and number — the OFI. This idea is furthered by the fact that the forms with ‘transitions’ are stressed on the [-e] and [-mo] suffixes that mark the satellite person (SP) agent in inverse forms (see Rule 3 in 8), and which always precede the OFI.

(12) Stress in verbs with ‘transitions’, based on Valdivia (1606):

- a. [elu-ɐe-j-m-u] b. [elu-ɐmo-j-u]
 give-3SP-IND-2-D give-2D.SP-IND.1-D
 ‘He_{SP} gave you both_{FP}’ ‘You two_{SP} gave us both_{FP}’

Still, we have the problem of the final-stressed imperative forms, which are portmanteaus marking mood, person and number. It is evident that such forms ([-ne] and [-pe]) are synchronically undecomposable, since they do not mark person and number according to the predominantly agglutinating pattern outlined above (cf. Table 3). It is possible that these forms are different in that they represent periphrastic constructions that have not been fully grammaticalised as regards stress. If this is so, [-ne] can be related to the root [ne-] ‘to be’ and [-pe] can be related to the root [pe-] ‘to see’. If, phonologically, they represent different words, we may assume that they are stressed separately as well, while [-tʰi] — presumably from the demonstrative [tʰi] — would have never borne stress, as expected for a function word.

These exceptions aside, verbal stress in the early seventeenth century Mapudungun of the dialects described in Valdivia’s grammar can be described as in (13):

(13) Verbal stress according to Valdivia (1606):

- Stress the final stem vowel.
- The stem corresponds to the entirety of the verb minus the obligatory finite inflection (OFI= mood, person and number).

2.2 Stage II: *Bernhardt Havestadt (1777) and Andrés Febrés (1765): Mid-eighteenth century Mapudungun stress*

For a century and a half, Valdivia’s grammar was the only widely available description of the Mapuche’s language, and it continues to be an invaluable resource for its history. The mid-eighteenth century, however, saw the arrival of two Jesuits who would endeavour to update the work of their predecessor.

The first of these grammarians was Bernhardt Havestadt (1714–1778), a Westphalian, who arrived in the Mapuche territories in 1748, remaining for twenty-two years. His grammar, though apparently available in a Spanish-language manuscript in the mid-1750’s, was published in Latin only in 1777 as *Chilidúgu: Sive Tractatus Linguæ Chilensis*.¹² This

¹² The marks in the spelling *Chilidúgu* do not represent stress, rather the ‘special ⟨u⟩’ — which we transcribe as [ʉ] elsewhere — and the ‘Spanish ⟨ng⟩ sound’ — which we transcribe as [ŋ]. Hence, ⟨Chilidúgu⟩ = [tʰili-θʉŋu] ‘Chile-speech’.

work — part grammar, part compilation of texts, and part travel-log — spans three volumes and nearly one thousand pages. In its structure, it mirrors Valdivia's work, adhering even more vehemently to the scholastic approach.

The second eighteenth-century grammar was that of a Catalan Jesuit, Andrés Febrés (1732-1790). Somewhat younger than Havestadt, he appears to have learnt the language and written his grammar less than five years after his arrival in Chile in 1759. It seems, however, that Febrés came into contact with Havestadt's *Chilidúgu* — in Spanish manuscript form — well before reaching the country (see Lenz 1895-1897: XLI-LI, and Havestadt 1777: 189). Febrés' grammar was, nevertheless, published before that of his German brother of the cloth, and is much more condensed, so was used more widely. Importantly, Febrés's grammar clearly outdoes that of Havestadt in its care in transcribing the sounds of the language, as is shown by abundant comment on pronunciation matters and exemplification.

2.2.1 Stress assignment data in Havestadt and Febrés's grammars

In terms of the presentation of verbal morphology, both eighteenth-century grammarians follow Valdivia quite closely, and hence, their analysis falls in with that set out in Table 3, above. As for the issue of stress assignment, Havestadt and Febrés' grammars differ in their presentation, but converge — for the most part — on the loci of stress. Although both grammars present stress in far more detail than Valdivia does, they are still very condensed, and we must do our best to tease out the details of their proposed systems.

2.2.2 Nominal and adjectival stress

Both Havestadt (1777: 2) and Febrés (1765: 6-8) give us a clear pattern for nouns and adjectives: stress the ultima if it ends in a consonant,¹³ otherwise, stress the penultimate syllable — a pattern we recognise from PDM nouns, in Table 1, above. This account is clearly at variance with that of the preceding grammar, as Valdivia depicts a quantity-insensitive system. Although the data is by no means exhaustive, it seems a reasonable assumption that in the period and dialects that Havestadt and Febrés cover, monomorphemic nominal and adjectival stress falls on

¹³ Febrés (1765: 6) actually says that default stress falls on a final syllable if it ends in a consonant or 'diphthong', i.e. ⟨au, eu, ay, ey⟩, etc. (probably [aw], [ew], [aj], [ej], etc.).

a right-aligned moraic trochee, as in (14). The only exception to this is given by Febrés (p.7), who claims that nouns with a final consonant preceded by [ɲ] are stressed on the penultimate syllable ([ɲne.mɲ] ‘word’, [ɲma.mɲɲ] ‘wood’, [ɲpe.lɲm] ‘guest’). As we have already claimed for the early-seventeenth-century data, [ɲ] appears to be the default epenthetic vowel, which is likely only triggered following stress assignment, posing no major threat to the trochaic analysis.

- (14) Stress in nouns and adjectives (Havestadt 1777, Febrés 1765)
- | | | | | | | | |
|----|------------|----|-----------|----|----------|----|-------------|
| a. | [ɲe.ɲa] | b. | [u.ɲɲɲar] | c. | [ɲtɲa.o] | d. | [ɲma.m(ɲ)ɲ] |
| | ‘not much’ | | ‘seed’ | | ‘father’ | | ‘wood’ |

Of course, while this analysis fits broadly the description for PDM nouns, the adjectival data remains at odds with the present-day data, where stress is invariably word-final. Although we are provided with no explicit data for adverbs and pronouns, we assume that these must follow the general rule stated by Febrés, thus contradicting the state of affairs of PDM, where these word categories behave like adjectives.

2.2.3 Stress shifting in Febrés (1765)

Havestadt’s first assertion on Mapudungun stress is that it is often ‘ambiguous or according to taste’ (1777: 20). However, we have seen that — at least for PDM — this variability is highly circumscribed to vowel-final disyllabic nouns. A closer look at the first seemingly naturalistic speech recorded for the language shows this variation to be similarly restricted in the eighteenth century. Indeed, Febrés provides the reader with two transcribed dialogues, the second of which he marks for phrase-final prominences (1765: 146-156), which he claims are typical of formal speech.

When they speak in the tone that befits a speech, which they call *coyaghtun* ([kojaɲtun]), all the words at which they make a pause are pronounced long, e.g. *deuma pepavin gami mapú*, *marimari ca Llancahuenú*, *Dios pile*, *pentuayu ca mitá*, etc. ‘I have already come to see your land, oh Llancahuenu! If God is served, we shall meet again’; where they pronounce the three words *mapu*, *Llancahuenu*, *mita* long, not because they are, but because they raise their voices further on these, and make a pause (8).

In the note that precedes his extended example of one such speech, he tells us:

I warn here that all the words that have an accent mark on the final syllable and are followed by a star, denote that upon that final syllable and word they

make a pause, raise their voice, pronouncing it as long and taking a breath for the next clause, which is the way to give a *coyaghtun* (145).

Upon closer inspection of the actual marking in the text (near 150 clauses), the vast majority of words marked for final stress are words where stress on the ultima is expected: monosyllables ([pí-n] ‘call-IND.1S’),¹⁴ and words ending in a consonant ([kθaw] ‘work’; [kuí-fal] ‘poor person’, [θmen] ‘rich person’, [láv-ken] ‘sea’, [kme-a-j] ‘good-FUT-IND.3’). The only cases where final stress is unexpected is in vowel-final disyllabic nouns ([pa-je] ‘priest, father’; [ma-pu] ‘land’), and the proper names of the two main speakers, [mi-a-le-vu] ‘gold-river’ and [anka-te-mu] ‘body-tree’¹⁵. Although the cases of final stress in these proper names are interesting, they can hardly be said to reflect the language’s general pattern. The evidence seems to point, rather, to the fact that this alternation is mostly restricted to disyllabic nouns ending in a vowel.

The phenomenon of stress shifting in formal speech – if described correctly by Febrés – seems to be a consequence of intonational processes. It is not difficult to imagine that Febrés’ perception of stress comes from an extreme pitch contour at the clause-edge (possibly a H*) in such spoken-discourse formulae (indeed, Molineaux 2014 finds pitch maxima to be the strongest correlate of PDM stress). It seems interesting, however, to ask whether this L2 interpretation of final stress in these forms would have been perceived as such by native speakers, or whether they would have simply seen these phenomena as changes in the language’s intonation-contour (cf. Molineaux 2016a: for PDM data). The fact that the pattern is found almost exclusively in disyllables will be key to our understanding of the later development of stress in the language (cf. §3)

2.2.4 Verbal stress

At a first glance, verbal stress is described in a very similar fashion to nouns: stress the final if closed, otherwise, stress the penultimate. Again, it is made plain that this excludes epenthetic vowels, which are never stressed, such as those in the first person singular indicative (e.g. [kim-(n)] ‘know-IND.1S’), and in the second and third person plural for all

¹⁴ Interestingly, postpositions such as [mew] are often stressed when final, as are particles such as [ve], which is described as interrogative or ornamental. Demonstratives and pronouns also appear in the clause-final position having stress on their only full vowel: cf. ⟨tva⟩ ~ [tθva] ‘this, thus’; ⟨en⟩ ~ [θen] ‘they two’.

¹⁵ Specifically the *blepharocalyx cruckshanksii* or *temo* tree.

moods (e.g. [eʔlu-m(ʔ)n] ‘give-IMP.2P’). As in Valdivia, the second and third person singular of the imperative are stressed on a final open syllable. Like in the seventeenth-century data, we assume these morphemes are somehow not fully grammaticalised, at least as regards the computation of stress.

A more unexpected pattern, however, is that of the first person plural of all moods, which, particularly Febrés, claims to bear stress on the penultimate,¹⁶ that is, on the vowel immediately preceding a final closed syllable. We can summarise these assumed stress-patterns for vowel- and consonant-final verb-roots in tables (9) and (10), respectively.¹⁷

		1 st	2 nd	3 rd
IND	S	[ʔʔʔi.ʔpa-n]	[ʔʔʔi.ʔpa-j.mi]	[ʔʔʔi.ʔpa-j]
	D	[ʔʔʔi.ʔpa.-ju]	[ʔʔʔi.ʔpa-j.mu]	"
	P	[ʔʔʔi.ʔpa.-iʔ]	[ʔʔʔi.ʔpa-j.mn]	"
SUBJ	S	[ʔʔʔi.ʔpa.-li]	[ʔʔʔi.ʔpa-l.mi]	[ʔʔʔi.ʔpa.-le]
	D	[ʔʔʔi.ʔpa.-lju]	[ʔʔʔi.ʔpa-l.mu]	"
	P	[ʔʔʔi.ʔpa.-liʔ]	[ʔʔʔi.ʔpa-l.mʔn]	"
IMP	S	[ʔʔʔi.ʔpa.-tʔʔi]	[ʔʔʔi.pa.-ʔne]	[ʔʔʔi.pa.ʔpe]
	D	[ʔʔʔi.ʔpa.-ju]	[ʔʔʔi.ʔpa.-mu]	"
	P	[ʔʔʔi.ʔpa.-iʔ]	[ʔʔʔi.ʔpa.-mʔn]	"

Table 9: Verbal paradigm for consonant-final root [ʔʔʔipa-] ‘exit’, after Havestadt 1777 and Febrés 1765 (forms contradicting the ‘general rule’ highlighted).

The case of consonant-final roots, in particular in the indicative, is radically different from what we find in the early seventeenth century. If we consider that, in many such forms, the penultimate syllable peak is occupied by the indicative marker — in this case the syllabic form of

¹⁶ Havestadt provides the same analysis for the first person plural of the subjunctive, but gives no data for the imperative. In the case of the indicative, he clearly signals the final syllable as the locus of stress, contradicting Febrés.

¹⁷ Havestadt, in claiming that ‘all first persons of the indicative’ bore final stress, seems to claim that the final open syllable of the indicative first person dual [ʔʔʔi.pa.-ʔju]. This is most likely an overgeneralisation of the rule. Especially looking at the data from Valdivia and Febrés’ grammars, final stress in this case would be extremely odd, since it would fall on a final open syllable as well as a clearly decomposable number-marker ([u] ‘d’, see Table 3). We assume, therefore, that the dual — which would have been the least familiar to a speaker of German and Spanish — was slightly overlooked as regards stress.

		1 st	2 nd	3 rd
IND	S	[ʔko.n-ʔn]	[ko.ʔn-i.mi]	[ʔko.n-ij]
	D	[ko.ʔn-i.ju]	[ko.ʔn-i.mu]	"
	P	[ʔko.n-iʔ]	[ko.ʔn-i.mʔn]	"
SUBJ	S	[ʔkon-.li]	[ʔko.n-ʔl.mi]	[ʔkon-.le]
	D	[ʔkon-.lju]	[ʔko.n-ʔl.mu]	"
	P	[ʔkon-.liʔ]	[ʔko.n-ʔl.mʔn]	"
IMP	S	[ʔkon-tʔʔi]	[kon-.ʔne]	[kon-.ʔpe]
	D	[ko.ʔn-i.ju]	[ʔkon-.mu]	"
	P	[ʔko.n-iʔ]	[ʔkon-.mʔn]	"

Table 10: Verbal paradigm for the consonant-final root [kon-] ‘enter’, after Havestadt 1777 and Febrés 1765 (forms contradicting the ‘general rule’ highlighted)

the high front sonorant (i.e. [i], where in vowel-final forms it surfaces as [j])¹⁸ — then Havestadt’s assertion, that the second person singular and the second and third dual and plural are stressed penultimately, leads to the indicative marker — not the last pre-OFI syllable (cf. 13) — being stressed.¹⁹

Besides first person plural forms, penultimate-mora stress also fails to fall on the non-finite markers [-el] and [-ʔm], in Febrés’ data. Furthermore, inverse marker [-e] is stressed by Febrés despite being followed by a closed syllable (as in Valdivia, cf. Table 12). In all these cases, some synchronic alternation seems to be afoot, sometimes stressing the penultimate mora, and sometimes the last pre-OFI syllable, as can be seen in Table 11.

We note then, that in all these forms, where stress does not follow the general rule, it seems to revert to what we find in the previous stage: stress on the last vowel before the OFI. The only exception are imperative [-ne] and [-pe].

It is our claim here, then, that the stem-final syllable does have some degree of stress, which is normally secondary to the stress on the penul-

¹⁸ Havestadt tells us explicitly that the [j]~[i] alternation for the indicative marker depends on whether it is preceded by a vowel, in which case it changes to ⟨y⟩ (1777: 26); however, in his transcriptions he never gives, for instance, ⟨yñ⟩ when following a vowel, so the rules of glide formation seem to be more of the type: ‘create a vowel where it avoids tautosyllabic consonant clusters’, as proposed for PDM in (7a).

¹⁹ In the 2nd person plural, Havestadt (1777: 5) assumes that, although unwritten, there is a very brief vowel between the final consonants (⟨ù⟩, in his script, [ʔ] here).

	‘give-IND-1P’	‘give-TEMP’	‘give-NOMS’	‘give-INV-IND.3-3SP’
Havestadt	[e.lu.-(i-)]	[e.lu.-(j.m)]	[e.lu.-(el)]	—
Febrés	[e.lu-(i-)]	[e.lu-(j.m)]	[e.lu.-(el)]	[e.lu.-e-(j-ew)]

Table 11: Stem-final vs. penultimate mora stress in Havestadt and Febrés (right-aligned moraic trochee in parenthesis)

time mora of the word. This would imply that, in building the verb’s morphological structure, stress assignment rules are applied twice, once to the stem and once to the word.

(15) Verbal stress in the mid-eighteenth century (Havestadt 1777, Febrés 1765)

- Stress a final closed syllable,
- otherwise, stress the penultimate syllable.
- Exceptions:
 - Inverse forms, 1st person plurals, and non-finite verbs may have stem-final stress.
 - Suffixes [-ɲe] ‘-IMP.2S’ and [-pe] ‘-IMP.3S’ are always stressed.

2.2.5 Summary of mid-eighteenth century stress assignment

Havestadt’s claim that many words are simply ‘ambiguous or according to taste’ as regards stress (1777: 20), appears to be symptomatic of a system in flux, though an appropriate linguistic generalisation was needed to restrict and explain the variation. The phrasal and pragmatic phenomena described by Febrés may be partially responsible for Havestadt’s observations, but the inconsistencies between the two grammarians point to other factors that are unstable within the system.

The picture we present of stress in this period is in many ways similar to what we find in our present day account. The most important similarity is the practically exceptionless footing of a right aligned moraic trochee at the word level. This is particularly true for the nominal system, excepting the cases with variable stress in PDM. The second similarity is the tendency to stress the stem-final vowel in verbs. One of the major differences,

however, is the fact that what appears to be the stem domain in the eighteenth century (and in the early seventeenth as well — all verbal morphology excluding the OFI) is significantly different to what our data found for the stem-domain in the twenty-first century (root plus core valency-changing suffixes, mostly, cf. §1.2).

Interestingly, considering the possible structures of mood, focal person and number suffixes, there are only two possible distributions for the verb's two stresses: conflation or clash. This less than ideal distribution of stresses, we venture, most likely led speakers, over time, to avoid clash by re-conceptualising the domains of the stem and word-morphology. We will ultimately see this reassessment of the stem-domain and the role of demarcative stress in the final historical works on the language, as well as in our own, twenty-first century data.

2.3 Stage III: *Rudolf Lenz (1896) and Félix de Augusta (1903): Mapudungun stress at the turn of the twentieth century*

Towards the end of the nineteenth century, the work of Rudolf Lenz, a German-born linguist and philologist, opened up the field of Mapuche Studies to university academics. Based in Santiago from 1890 until his death, in 1938, Lenz focused first on the peculiarities of Chilean Spanish, which he claimed was 'basically Spanish with Araucanian sounds' (1893: 208). He soon turned his interest to Mapudungun itself, travelling repeatedly to Mapuche territories and making detailed notation of stories, poems, speeches and dialogues. His main works on Mapudungun — written between 1895 and 1897 — were compiled in *Estudios Araucanos*. For the first time in Mapudungun studies, the work did not have a pedagogical objective (as did the missionary grammars), but rather attempted a careful, scientific description.

In parallel, Felix de Augusta, part of a new contingent of Bavarian Capuchins, took on the task of renewing the missionary materials for working with the Mapuche, now forcibly relocated to reservations. His *Gramática Araucana* (1903) is the result of Augusta's first eight years of work in Chile's Araucanía Region. It is perhaps the most manifestly 'pedagogical' of the missionary works, structured as a series of brief grammar points followed by examples and exercises, as was the model of the day for learner grammars. Although the *Gramática* is Augusta's most explicit work on the language's structure, it should be taken as part of a trilogy — alongside his collection of texts, *Lecturas Araucanas* (1910), and superb bilingual dictionary (1916) — which provide a broader practical description of the language (Salas 1985, Molineaux 2016c).

2.3.1 Stress assignment data in the work of Lenz and Augusta

Lenz's views on the phonetics and phonology of the language are sprinkled quite generously across his work. The most extensive account is given in the prologue to his collected articles on Mapudungun (Lenz 1895-1897), where, with regards to stress, he states that it 'has little strength and stability, changing its place according to laws of balance that are scarcely fixed' (XXIV). However, in a footnote elsewhere in the volume, he agrees with Febrés in claiming that 'words are stressed on the penultimate syllable; only when ending in a consonant do they become acute' (388 fn.I).

Augusta's account of stress is stated early on in his first work on Mapudungun, giving a 'general rule', followed by a series of partial or superficial exceptions. As in the case of Lenz (as well as Havestadt and Febrés) he places stress on 'the last syllable when it is closed or has a diphthong [i.e. a vowel plus a glide] and the penultimate elsewhere' (1903:2-3). Although, overwhelmingly, stress is not marked in Lenz or Augusta's transcriptions, where it is specified, this general pattern is most often upheld.

2.3.2 Nominal and adjectival stress

In a 1893 article, preceding his *Estudios*, Lenz is more precise than anywhere else regarding Mapudungun stress:

'Stress varies in accordance with lexical combinations; in general, words ending in a consonant are stressed on the last full syllable (those which do not include [ə]), while simplex, polysyllabic words ending in a vowel, are stressed on the penultimate syllable.(202)'

It is interesting, however, that in his collection of texts, stress is sometimes marked on what he elsewhere transcribes as a schwa (for Lenz schwa alternates with the epenthetic [ə]), in the final syllable (16:d,e).

(16) Sample nominal stress in the Lenz's *Estudios* (1895-1897)

- | | | | | |
|------------------|--------------|----------------|----------------|------------------|
| a. [kə.ə.ə.e.ɲu] | b. [əlon.ko] | c. [ku.ə.ə.in] | d. [vo.ə.tə.m] | e. [nəa.ə.mə.nə] |
| 'tear' | 'chief' | 'cattle' | 'son' | 'foot' |

Augusta's assessment of nominal stress is very similar to that of Lenz, as it derives from his 'general rule' (penultimate mora stress), with two added exceptions: one stating that 'disyllables that have a schwa in the first syllable are stressed on the last syllable regardless of the general rule', and the other, that 'disyllables that have a schwa in the final syllable

have two stresses (a spondee)’(1903:4). Examples are: [p̥.ɔ̃li] ‘soul’, [p̥ɔ̃ɔ̃i] ‘fly_N’ and [ɔ̃fo.ɔ̃tɔ̃m] ‘son’; [ɔ̃ma.ɔ̃mɔ̃ɔ̃] ‘wood’. If indeed the dialect that Augusta describes has this distribution, we could explain the final stressed syllable forms with [ɔ̃] in the first syllable, as well as the cases of ‘spondee’ stresses, by assuming that right-edge stress is applied cyclically to the noun: this would occur once before epenthesis, and once after, as suggested in Table (12). Be this as it may, taken together with the data from Lenz, Febrés and PDM, it seems clear that the interaction between stress and nominal epenthesis is not altogether settled, and, indeed, the historical epenthetic vowel might be in the process of entering the lexical representation of at least some of the dialects and words of 18c Mapudungun.

	Underlying	Stress	Epenthesis	Stress	Surface	Gloss
a.	/pli/	ɔ̃pli	p̥ɔ̃.ɔ̃li	–	[p̥ɔ̃.ɔ̃li]	‘soul’
b.	/fotm/	ɔ̃fotm	ɔ̃fo.t̥m	ɔ̃fó.ɔ̃t̥m	[ɔ̃foɔ̃t̥m]	‘son’

Table 12: Stress and epenthesis in nouns, based on Augusta (1903)

Interestingly, although neither Lenz nor Augusta explicitly mention stress in other word categories than nouns and verbs, in both authors’ collections of texts (especially Lenz’s), stress is often marked on the final open syllable of disyllabic adjectives, adverbs, pronouns and demonstratives (cf. Lenz: [mu.ɔ̃na] ‘few’, [wi.ɔ̃le] ‘tomorrow’, [ki.ɔ̃ɔ̃e] ‘one/DET’ and [tu.ɔ̃fa] ‘this’, Augusta: [we.ɔ̃θa] ‘bad’, [f̥ɔ̃ta] ‘old’). We assume, then, that this is the normal position of stress in such words, since we find no instances where their stress is marked initially.

2.3.3 Stress-shifting

The major exception to the nominal pattern are the — by now familiar — disyllables ending in a vowel. In the prologue to his *Estudios* Lenz exemplifies the ‘scarcely fixed’ nature of stress in words such as *ruka* ‘house’, giving the forms in (17a) and (17b). Upon closer inspection, in texts corresponding to all language varieties, we see that it is the disyllables with a final open syllable that appear with stress in both positions, as we can see in examples (17c) vs. (17d).

- (17) Varying stress (underlined> in Mapudungun, based on Lenz (1895-1897):

- a. [tʔ.ʔfa.-mu mʔ.l-i ʔi ʔru.ka] (p.XXIV)
 DET-POST be-IND.3S my house
'Here is my house'
- b. [ʔi ru.ʔka mo kʔ.ʔpa-n] (p.XXIV)
 my house from come-IND-1S
'I come from my house'
- c. [wu.ʔʔa.-ʔla-j tʔʔi ʔlon.ko] (p.18)
 stand-NEG-IND.3S the chief
'The chief did not stand up'
- d. [mʔ.le.-fu ka.θi.ke, lon.ʔko] (p.18)
 be-BI leader chief
'they were leaders, chiefs'

We note that, although the lack of stability is claimed for the language overall, the alternate position of stress on a final open syllable is restricted to two-syllable words, in particular, nouns. Clearly the forms that do not follow the general rule seem most common clause-finally, or preceding the postposition [mo]/[mew] (a claim explicitly made by Augusta 1903: 4), but this behaviour is not consistent for such a position, nor exclusive to it.²⁰

As for Augusta, his actual transcripts do not diverge from the rules given in the grammar and the introduction to the *Lecturas*, except in the case of the adjectives. Nowhere in the transcriptions — and in contrast to Lenz's contemporary texts — do we find stress marked on the final open syllable of a noun in isolation. This, in our view, seems symptomatic of Augusta's representation of a lexical pattern, rather than the surface, post-lexical one, which Lenz would have had access to²¹. The key difference here is that Augusta is likely to have been one of the most proficient of

²⁰ Note, for instance the transcription [ʔma.pu mo] in Lenz's texts (p.34), and the position of stress in phrase-final [ʔma.pu] and [ʔlon.ko] in (17a) and (17c), respectively. Although rare, there are a few examples of disyllables transcribed with stress on a final vowel, even when not phrase final, as in [pʔ.tʔʔi ʔma.pu ru.ʔka mʔ.le.-ka.-j-a-j] 'bit earth house be-CONT-FUT-IND.3 (there won't be much distance to the house)' (p.97). It is possible, of course, that the speaker placed an intonational break following the word [ru.ka], which brought with it the change in perceived stress.

²¹ Augusta tells us that 'aside from the prosodic stresses, we also find declamatory or emphatic stresses which allow a certain syllable to be reinforced outside the rules of

the L2 speakers of Mapudungun to write a grammar of the language, while Lenz — a very competent phonetician — would have lacked the long-term exposure necessary to tease apart the lexical and post-lexical patterns of prominence.

2.3.4 Verbal stress

While Lenz gives no explicit guidance regarding verbs, in Augusta's work, stress follows the general rule in the first person singular of all moods, with other conjugations following this form's stress (see Table 13). Only in the subjunctive does Augusta claim an exception, with the first person plural not following the singular's pattern, but rather following the general rule to stress a final closed syllable.

The resulting system, in Table 13, is one where the overwhelming majority of OFI-paradigm forms, in vowel-final roots, are stressed on the penultimate mora. The exception to this pattern — as in the data for the 18th century — are the first person plural of the indicative and the imperative, which have their stress on the root-final syllable. However, the subjunctive form no longer has exceptional, pre-OFI stress, and the second and third person singular of the imperative have come under the general rule.

		1 st	2 nd	3 rd
IND	S	[ʔʔʔʔi.ʔpa-n]	[ʔʔʔʔi.ʔpa-j.mi]	[ʔʔʔʔi.ʔpa-j]
	D	[ʔʔʔʔi.ʔpa.-ju]	[ʔʔʔʔi.ʔpa-j.mu]	"
	P	[ʔʔʔʔi.ʔpa.-iʔ]	[ʔʔʔʔi.ʔpa-j.mn]	"
SUBJ	S	[ʔʔʔʔi.ʔpa.-li]	[ʔʔʔʔi.ʔpa-l.mi]	[ʔʔʔʔi.ʔpa.-le]
	D	[ʔʔʔʔi.ʔpa.-lju]	[ʔʔʔʔi.ʔpa-l.mu]	"
	P	[ʔʔʔʔi.pa.-ʔliʔ]	[ʔʔʔʔi.ʔpa-l.mʔn]	"
IMP	S	[ʔʔʔʔi.ʔpa.-tʔʔi]	[ʔʔʔʔi.ʔpa.-ne]	[ʔʔʔʔi.ʔpa.pe]
	D	[ʔʔʔʔi.ʔpa.-ju]	[ʔʔʔʔi.ʔpa.-mu]	"
	P	[ʔʔʔʔi.ʔpa.-iʔ]	[ʔʔʔʔi.ʔpa.-mʔn]	"

Table 13: Verbal paradigm for consonant-final root [ʔʔʔʔipa-] 'exit', after Lenz 1895-1897 and Augusta 1903.

For roots ending in a consonant, Augusta claims the existence of an epenthetic vowel, which in the first person singular of the indicative is

stress assignment' (1910 p. XI). No specific conditions for this reinforcement are given, nevertheless.

often stressed ([e.ʔl-ʔn] ‘put-IND.1s’). This is the case if the root is monosyllabic (i.e. [el-], ‘put’; [wʔl-] ‘give’). Otherwise, in polysyllabic roots, stress is assigned to the preceding vowel ([kuʔʔʔʔan-ʔn] ‘sicken-IND.1s’)²².

		1 st	2 nd	3 rd
IND	S	[ko.ʔn-ʔn]*	[ko.ʔn-i.mi]	[ko.ʔn-ij]
	D	[ko.ʔn-i.ju]	[ko.ʔn-i.mu]	"
	P	[ko.ʔn-iʔ]	[ko.ʔn-i.mʔn]	"
SUBJ	S	[ʔkon-.li]	[ʔko.n-ʔl.mi]	[ʔkon-.le]
	D	[ʔkon-.lju]	[ʔko.n-ʔl.mu]	"
	P	[kon-.ʔliʔ]	[ʔko.n-ʔl.mʔn]	"
IMP	S	[ʔkon-.tʔʔi]	[ʔkon-.ɲe]	[ʔkon-.pe]
	D	[ko.ʔn-i.ju]	[ʔkon-.mu]	"
	P	[ko.ʔn-iʔ]	[ʔkon-.mʔn]	"

Table 14: Verbal paradigm for the consonant-final root [kon-] ‘enter’, after Lenz 1895-1897 and Augusta 1903. * = but also: [ku.ʔʔʔʔa.n-ʔn] ‘disease-IND.1s’

As we see in Table 14, the position of stress for consonant-final roots is fully consistent with the right-aligned moraic trochee of nouns. Still, the picture for the epenthetic vowel in verbs seems murky at best. Although nowhere in Augusta’s texts is stress marked on these epenthetic vowels,²³ we do find cases where Augusta does not transcribe the epenthetic vowel itself after a monosyllabic root (cf. ⟨kim-n⟩ ‘know-IND.1s’ p. 204). Furthermore, in Lenz’s work, although we do find cases of stressed epenthetic vowels after monosyllabic roots, such as, precisely, ⟨ki.m-ʔn⟩ ‘know-IND.1s’ (1895-1897: 38), there are also disyllabic roots that follow this pattern, such as ⟨ja.we.l-ʔn⟩ ‘ride-IND.1s’ (104).

Just as in nouns with epenthesis, it appears we are dealing with a process that is no longer fully post-lexical, since the epenthetic vowel is some-

²² Augusta also claims that, in consonant-final roots, the third person singular of the indicative receives stress on the vowel preceding the inflection, given the example of [kuʔʔʔʔan-ij] ‘sicken-IND.3s’. This example is problematic, seeing as how it is a denominal verb, and may attract additional stress to the root-final syllable. Also, in his own texts, Augusta marks stress on the final syllable of such cases: eg. [ʔo.ʔw-i-j] ‘receive-IND-3s’ (1910:37).

²³ The marking of stress on schwa and ⟨ʔ⟩ ([ʔ] in Augusta’s texts) presented important difficulties for early 20th century typesetting, as Augusta complains in his introduction to the *Lecturas* (1910: XI).

times susceptible to stress marking. The interaction with the stem-level stress is crucial to the realisation of stress in such cases. We will return to the issue, however, in our general analysis of the period.

2.3.5 Left-edge stress?

For the first time, at Stage III, we get enough data to examine the issue of an apparent second stress for compounds and verbs. As in contemporary accounts, this stress appears to be realised on the final syllable of the first morphological element (the verbal root or first noun in a compound). However, in verbs we are only explicitly told about this second stress where there is more than one root (i.e. verbs with nominal incorporation or serial verbs) or if there is suffixation beyond the OFI.²⁴ The implication, of course, is that minimally inflected forms do not have an independent stress on the stem. In most vowel-final stems this is irrelevant, since stem and word stresses are predicted to be conflated, but in particular in the consonant-final ones, there is room for both stresses. Unfortunately, Augusta gives no exemplification of these cases.

ROOT+OFI	ROOT+OFI	ROOT+SFX+OFI	ROOT+ROOT+OFI
[[e.ʔlu] _R -j.-m-i]	[[ko.ʔn] _R -i.-m-i]	[[ʔje.] _R -pa.-ʔla-j.-m-i]	[[ʔʔʔa.ʔna.] _R -na.ʔʔ-ij]
'give-IND-2-S'	'enter-IND-2-S'	'carry-CIS-NEG-IND-2-S'	'strike-down-IND-3S'

Table 15: Stress in minimally inflected verbs (vowel and consonant-final), further suffixed verbs, and serial verb constructions (R=root).

In Lenz's work, additional stresses in longer verbs are occasionally transcribed. In practically all cases, these stresses are verbal and surface on the root-final syllable (cf. Table 18).

(18) Sample stem stress in (Lenz 1895-1897, R=root)

- a. [[u.ʔjem.]_R-tu.-ʔvi.-ŋe] b. [[ʔki.m]_R-a.-ʔvu-j] c. [[a.ʔʔʔʔun.]_R-kʔ.ʔle-n]
 'light-REST-3SP-IMP.2S' 'know-FUT-BI-IND.3' 'fatigue-PROG-IND.1S'

Augusta's *Gramática* states that compounds have their stress where it would be expected for the first root, although it often moves to its final syllable. Indeed, in the examples he provides us with in his *Gramática*, as well as in the transcriptions in his texts (1910), stress is consistently on the final syllable of the first root (cf. 19).

²⁴ Augusta tells us that 'Verbs with interposed particles [i.e. pre-OFI suffixes] also have two stresses, the primary one being on the verbal root and the secondary, where the given rules require it' (1903: 4)

- (19) Stress on the first root of a compound, according to Augusta:
 a. [ku.ʔe.pʔi] (p.83) b. [fo.ʔθu.-tʔa.wa] c. [ka.ʔe.-ka.ʔe]
 ‘old.lady-soul’ ‘spine-fish’ ‘shrub-shrub’

Of course, final stress in the first element of longer words is a feature we find both in the earliest stage of the language and in the contemporary account, presented in §1 as a case of stem-final stress. Clearly, here the definition of *stem* differs from the earliest stages of the language, and even from that at the immediately preceding attested stage (cf. §2.2.4). It remains to be seen whether the stem form we find in Lenz and Augusta is compatible with our own account of PDM.

2.3.6 Summary turn of the twentieth century stress

According to Lenz and Augusta, there are two major stress positions for Mapudungun of the period, one on the penultimate mora of the word, and in longer words, another on the final syllable of the leftmost element. There is also some visible alternation in the case of vowel-final disyllables (especially, in Lenz’s *Estudios*, for the case of nouns).

Some non-trivial interaction between stress and epenthesis shows up as well, with Lenz and Augusta showing variability in the stressing of final-syllable, interconsonantal [ʔ]~[θ]. In the light of our own contemporary data, where this vowel receives stress, it seems that Lenz and Augusta’s data represent an intermediate stage between a purely post-lexical process of epenthesis, and a vowel-full underlying representation. Indeed, in Lenz’s texts from northern and eastern varieties of Mapudungun, we find that stressing the epenthetic is exceptionless, perhaps indicating that here lexicalisation of the process is complete (see tables 16 and 17).

In the case of the disyllables, there is also some alternation for vowel-final forms, which seems, at this historical stage to be restricted to phrase-final position or to the position preceding the postposition *mo/mew*²⁵. In that it is only a tendency, rather than a categorical shift of stress position, and that it refers to phrasal edges and the concatenation of specific words or functional elements, final open syllable stress bears the hallmarks of a phrasal rule.

A key aspect of the verbal stress system, as presented explicitly by Augusta and exemplified often by Lenz, regards the interaction of stem and word-level stress. It appears that where the final syllable of the verbal

²⁵ For the functions of the postposition see Harmelink (1987).

	Febrés (1765) (North/Center)	Augusta (1903) (Center)	Lenz (1897) (North/East)
Underlying	/nʔamʔ/	/nʔamʔ/	/nʔamʔnʔ/
Cycle 1:STRESS	ʔnʔamʔ	ʔnʔamʔ	nʔa.ʔmʔnʔ
EPENTH	—	ʔnʔa.mʔnʔ	—
Cycle 2:STRESS	—	ʔnʔa.mʔʔnʔ	—
Post-Lex:EPENTH	ʔnʔa.mʔnʔ	—	—
Surface:	[ʔnʔa.mʔnʔ]	[ʔnʔa.ʔmʔnʔ]	[nʔa.ʔmʔnʔ]

Table 16: Dialectal (and historical) differences in the position of stress in disyllabic nouns with final syllable interconsonantal [ʔ]~[ʔ] (Example: [nʔamʔnʔ] ‘foot’)

	18th Century (North/Center)		Augusta (1903) (Center)	Lenz (1897) (North/East)		
UNDERLYING	/kim-n/	/el-n/	/kim-n/	/el-ʔn/	/kim-ʔn/	/el-ʔn/
STRESS	ʔkimn	ʔeln	ʔkimn	e.ʔlʔn	ki.ʔmʔn	e.ʔlʔn
EPENTHESIS	ʔki.mʔn	ʔe.lʔn	ʔki.mʔn	—	—	—
Surface	[ʔki.mʔ]	[ʔe.lʔn]	[ʔki.mʔn]	[e.ʔlʔn]	[ki.ʔmʔn]	[e.ʔlʔn]

Table 17: Dialectal (and historical) differences in the position of stress in consonant-final roots with a [ʔ]~[ʔ] vowel preceding [-n] ‘-IND.1S’ marking (Examples: [kim-ʔn] ‘know-IND.1S’; [el-ʔn] ‘place-IND.1S’)

root and mood-marking are not adjacent (i.e. where there are suffixes beyond the OFI), there are two stresses, one on the final syllable of the root, and the other on the penultimate mora of the word (cf. Table 15 and example 18).

It is Augusta’s claim that the first element in such constructions — the root, or underived stem — bears main stress, while the rightmost stress is secondary. Transcriptions of stress in Lenz’s texts, however, show this to be somewhat unstable. Here, the majority of verbal forms have only the rightmost, penultimate-mora stress transcribed, while stem-final stress is only occasionally marked.

In other words, although the two stresses are important to the system, their relative prominence appears to be only marginally relevant. As in the contemporary account, we find here that the culminativity of stress does not seem to be enforced particularly strongly in words with complex morphological structure. What does seem important, however, is to

mark the edge of the leftmost constituent, which emphasises demarcation over rhythm and culminativity — a feature we also see in nominal compounds (cf. Table 19). The existence of morphological-boundary-related contours in the stress patterns appears to be more important than the relative height of the peaks.

Finally, accounting for invariant final stress on adjectives, adverbs and pronouns requires some adjustment to the general penultimate-mora stress-assignment system. Interestingly, this pattern appears similar to that of the first stem-element in compounds and verbs. Since we have remained agnostic as to exactly what mechanism brings about stem-final stress, we do the same for these peripheral word categories. We do claim, however, that they must be stressed at the same level as the stems. In a way, the fact that these are all dependent word categories — they do not tend to stand alone, but modify or complement verbs or nouns — may allow us to say that they are not stressed as full prosodic words.

(20) Summary of Mapudungun stress at the turn of the century:

- Nouns:
 - Stressed on a right-aligned moraic trochee.
 - Epenthesis: varies by dialect/stage of the language.
 - [ʔ]~[ɲ] breaks up clusters.
 - Always post-lexical in the penultimate syllable or earlier.
 - In a final syllable it may be post-lexical (Augusta), or part of the UR and stressable (Lenz).
 - Exceptions:
 - Stress on word-final vowels may occur in disyllables at the end of the utterance.
- Verbs:
 - Word-stress:
 - Falls on the penultimate mora of the stem.
 - The first person plural of the indicative and imperative are stressed on the last pre-OFI syllable, despite the final syllable being closed.
 - The (erstwhile) epenthetic vowel in the -IND.3S marker -*n*/*ɲn* is regularly stressed in Lenz's texts and occasionally in Augusta's.

- Stem-stress:
 - Falls on the final syllable of the root, where not adjacent to the OFI.

3 Preservation and change in Mapudungun stress 1606 – today

As will be clear thus far, the most striking features of stress-related change in the first three centuries of the historical period of the Mapuche language are the system’s overall transition from syllabic to moraic trochees (§3.1), the redefinition of the domain of the stem (§3.2), the lexicalisation of epenthesis in specific morphological and prosodic contexts (§3.3), and the development of final-syllable stress in some word-categories (§3.4). In what follows, we will examine the stages of each one of these changes, evaluate them with regards to the general situation of the language at the time (§3.5), and contrast them with what has actually been preserved despite the changes (§3.6). More general conclusions regarding the data for the history of Mapudungun morphology and stress interactions follow (§4).

3.1 Changes in weight sensitivity

The earliest observation we have for Mapudungun (Valdivia 1606: 74) claims that stress — in all word categories but verbs — falls on the penultimate syllable. Approximately one hundred and fifty years later, this pattern appears to be restricted only to vowel-final nouns, while consonant-final ones have shifted their stress to the final syllable. Explicit claims at later stages in the language find this pattern to persist, although there is a tendency to stress a disyllable’s final vowel in certain morpho-syntactic positions (Stages II and III) or in particular registers (Stage IV).

Stage I	Stage II	Stage III	Stage IV	Gloss
(ʔru.ka)	(ʔru.ka)	(ʔru.ka)~ (ru.ʔka)	(ʔru.ka)~ (ru.ʔka)	‘house’
(ʔpu.kem)	pu.(ʔkem)	pu.(ʔkem)	pu.(ʔkem)	‘winter’
ma.(ʔwi.θa)	ma.(ʔwi.θa)	ma.(ʔwi.θa)	ma.(ʔwi.θa)	‘woodland’
a.(ʔtʔa.waʔ)	a.tʔa.(ʔwaʔ)	a.tʔa.(ʔwaʔ)	a.tʔa.(ʔwaʔ)	‘hen’

Table 18: Changes in nominal stress in di- and tri-syllables: vowel and consonant final (feet in parenthesis)

We assume that the blanket claim for penultimate stress at Stage I applies not only to nouns but to all other non-verbal word categories. By Stage II, the weight-sensitive pattern seems to apply to these word-categories as well, though we have some initial evidence for stress shifting to the final of two syllables in particular syntactic contexts and registers (see §3.4, below). By the turn of the 20th century most disyllabic adjectives, adverbs and pronouns were stress-final, a pattern that continues into PDM (Stage IV).

Stage I	Stage II	Stage III	Stage IV	Gloss
(ko.θo)	ko.(θθo)	ko.θθo	ko.θθo	'purple'
we.θa	we.θa	we.θa	we.θa	'bad'

Table 19: Changes in adjectival stress: vowel and consonant final forms (applicable also to adverbs, pronouns and determiners)

As regards verbs, the Stage I data seem to show a fundamentally morphologically-driven stress assignment system, which places stress on the final vowel before the OFI. However, in the vast majority of the verbal paradigms this position is effectively the penultimate syllable. We suggest, therefore, that where the two are not coextensive, there must be a word-level rule promoting stem stress over the penult.

Our analysis of Stage II showed verbal stress to follow the same overall pattern of Stage I in terms of stressing the stem-final vowel and the head of a right-aligned trochee, the only differences being that the trochee, as in nouns, was considered to be weight sensitive and to take priority over stem stress. Effectively, this means that the trochee is more clearly surface-true than in Stage I.

In Stage III, verbs are also stressed on a right-aligned moraic trochee and on the final syllable of the stem. At this point, however, the stem appears to be restricted mostly to the verbal root. Where the two stress rules do not target the same syllable, it is Augusta's contention that the stem takes priority over the root, however, this occurs only where the stem is not immediately adjacent to the OFI (1903: 4).

In our own data for Stage VI we find a very similar pattern to that of Stage III, the only major difference being that the stem is defined as the root followed by a limited number of mostly valency-changing suffixes (cf. §1.2). In this case, the penultimate mora tends to be promoted in the context of clash with the stem-final syllable (which is usually destressed), except when the stem is derived, in which case it takes main stress.

Stage I	Stage II	Stage III	Stage IV	Gloss
(ʔko.n-ij)	ʔko.(ʔn-ij)	ko.(ʔn-ij)	ʔko.(ʔn-ij)	‘enter-IND.3-S’
ʔko.(ʔn-i.mi)	ʔko.(ʔn-i.mi)	ko.(ʔn-i.mi)	ʔko.(ʔn-i.mi)	‘enter-IND.2-S’
e.(lu.-ʔfi-n)	e.lu.(-ʔfi-n)	e.ʔlu.(-ʔfi-n)	e.ʔlu.(-ʔfi-n)	‘give-IND.1-S’

Table 20: Changes in right-edge verbal stress (feet in parenthesis, OFI underlined)

If our data is relatively accurate, the change from syllabic to moraic trochees occurs early in the recorded history of the language, between Stages I and II. For the learner, evidence of final closed syllables being stressed would have most obviously come from the verbal system, in particular from the first person indicative and a number of other forms where the OFI is preceded by a vowel (cf. Table 21). Interestingly, in the remainder of the forms of the paradigm there is a very strong tendency for the final syllable to be open and for stress to fall on the penultimate. As a result, the percept would have been that the stem-final stress — which was main stress as well — was usually also on the penultimate mora.

Final Closed	e.ʔlu-n	‘-ind.1s’	e.ʔlu-l-m-n	‘-subj-2-p’	e.ʔlu-j	‘-ind.3s’
Penult Vowel-final	e.ʔlu-j.-m-i	‘-ind-2-s’	e.ʔlu-l.-j-u	‘-subj-1-s’	e.ʔlu-tʔi	‘-imp.1s’

Table 21: Stage I stem-stress on a final closed syllable and on a penultimate syllable in a vowel-final verb (example: [elu-] ‘give’)

3.2 Changes in the stem domain

Stage I of the our attestations displays an almost purely morphological rule for verb stress: prominence falls on the final vowel of the first person singular indicative — invariably the syllable preceding the OFI — which is then reproduced throughout the paradigm with minimal exceptions (cf. Valdivia 1606: 75). Stage II presents a very similar pattern of stem-final stress, though in competition with penultimate-mora stress. By Stage III, however, we find that primary stress is on the root-final syllable (cf. Table 22c,d), except in the cases where the root is followed exclusively by an OFI, in which case the word-level right-aligned moraic trochee is stressed (cf. Table 22b). Our own Stage IV data shows a similar pattern, where roots may be extended to stems by the addition of a very limited set of suffixes (Table 22d).

Importantly, by Stage II the purely morphological pattern of stem-final stress has been phonologised to become penultimate-mora stress. This means that stress in Stage II no longer signals the morphological struc-

Table 22: Changes in stem stress in verbs (feet in parenthesis, OFI underlined)

	Stage I	Stage II	Stage III	Stage IV	Gloss
a.	e.(<u>lu</u> -j)	e.(<u>lu</u> -j)	e.(<u>lu</u> -j)	e.(<u>lu</u> -j)	'give-IND.3s'
b.	<u>ko</u> .(n- <u>l</u> .mi)	<u>ko</u> .(n- <u>l</u> .mi)	ko.(<u>n</u> - <u>i</u> .mi)	<u>ko</u> .(<u>n</u> - <u>i</u> .mi)	'enter-IND-2-s'
c.	e.lu.-(<u>la</u> -j)	e.lu.-(<u>la</u> -j)	e. <u>lu</u> .(<u>-la</u> -j)	e. <u>lu</u> .(<u>-la</u> -j)	'give-NEG-IND.3s'
d.	e.lu.- <u>ne</u> -(<u>la</u> -j)	e.lu. <u>ne</u> .(<u>-la</u> -j)	e. <u>lu</u> . <u>ne</u> .(<u>-la</u> -j)	e.lu. <u>ne</u> .(<u>-la</u> -j)	'give-PASS-NEG-IND.3s'

ture of verbs as clearly. Indeed, when penultimate-mora stress and pre-OFI-syllable stress are not conflated, the latter stress is demoted due to immediate adjacency to the main stress.

As a result, we propose that the marking of the last pre-OFI syllable soon became redundant (between stages II and III), and additional stress retracted to the next prominent morphological position: the root-final syllable, which is what we find for Stage III. This change would have had the important functional role of helping to parse longer verbs, by signalling the edge of the root. It is unclear whether the suffixes that we have identified as stem-extending in Stage IV were also the locus of stress at Stage III (except for passive [-ne], which does not bear stress). Nevertheless, by PDM the stem domain (or extended-root domain) was extended in order to include these suffixes with core root-semantics (see §1).

It appears, therefore, that at every stage of the language there are two types of stress at play, one which is fundamentally morphologically driven and the other which is fundamentally phonologically driven. Their interaction is complex and the predominance of one over the other is not always clear. This said, Mapudungun seems to persistently accommodate stress marking to its morphological signalling function.

3.3 Lexicalisation of epenthesis

While throughout attested Mapudungun the locus for epenthesis seems relatively straightforward — breaking up series of onset or coda consonants —, from Stage III onward, there is evidence, in some contexts, for erstwhile epenthetic vowels becoming part of the lexical representation. Crucially, this would allow the inserted vowel ([ɨ]~[ʉ]) to be stressed.

In Stages I and II, epenthesis seems to be purely post-lexical, as the inserted vowels are not relevant to the computation of stress. By Stage III, however, both nominal and verbal epenthesis seem to interact with stress in some contexts. Augusta claims, to this effect, that sometimes nominal stress occurs both on a syllable-final epenthetic and on a preceding vowel (a 'spondee' pattern cf. ??), and that verbal epenthetic vowels preceding the suffix [-n] 'IND.1s' are also variably stressed (cf. ??). How-

ever, in Lenz’s data it seems that, for both contexts, stress falls on the epenthetic. This latter pattern is what our own Stage IV data present.

	STAGE I	STAGE II	STAGE III (Augusta)	Stage III (Lenz)	STAGE IV	Gloss
a.	[ʔnʔamɲʔ]	[ʔnʔam(ʔ)nʔ]	[ʔnʔaʔmʔnʔ]	[nʔaʔmʔnʔ]	[nʔaʔmʔnʔ]	‘foot’
b.	[ʔpʔi]	[p(ʔ)ʔʔi]	[p(ʔ)ʔʔi]	[p(ʔ)ʔʔi]	[p(ʔ)ʔʔi]	‘soul’
c.	[ʔkon(ʔ)n]	[ʔko.n-ʔn]	[ʔko.ʔnʔn]	[ko.ʔnʔn]	[ko.ʔnʔn]	‘soul’

Table 23: Epenthesis (in parenthesis) vs. underlying [ʔ] and its relation to stress in the history of Mapudungun

One of the major conclusions we can draw from the epenthesis data is the tendency to stress the rightmost closed syllable over the leftmost (in disyllables), so lack of an epenthetic appears more commonly in the first syllable for nouns. The other key issue is that epenthesis is lexicalised more easily when the morpheme it becomes part of underlyingly has more of a fusional structure — as the case of [-ʔn]/[-n] ‘-IND.1s’ — that is, when it cannot be decomposed into its constituent parts. Contrast the epenthetic in [-m-ʔn] ‘3-s’, which is never stressed. This seems rather common sense, as in the case of portmanteau morphemes there is no necessary correspondence of one morph to one meaning, hence freeing up the morpheme from corresponding to the other elements of the paradigm. In other words, portmanteau morphemes appear to more readily develop allomorphy.

3.4 The rise of final-syllable stress

With the exception of some vowel-final nouns as well as the right-edge of verbs, PDM shows a clear pattern of final stress. Not only does this apply to adjectives, adverbs and pronouns, but also to the domain of the verb stem, and the first element of compounds. Diachronically, the issue of stress on the final syllable of verb-stems (cf. Table 24a-b) seems rather uncontroversial, as this is the stated position of main stress — always with some caveats — in the first three stages of the language. Although there has clearly been a shift in the position of this stress, it has never been to the first syllable of the root, except in the case of monosyllables. For the case of compounds (cf. Table 24c-f), we only have data beginning in Stage III. In Augusta’s work, however, there are only disyllabic stems as first elements, all of which are stressed on the final syllable, regardless of weight. In our own Stage IV data there are also trisyllabic stems as first elements. Here the pattern is different, as it follows that of trisyllables in

isolation: final syllables are stressed if closed, otherwise, the penultimate is stressed.²⁶

	STAGE I	STAGE II	STAGE III	STAGE IV	Gloss
a.	[ko.n _s -i.-m-u]	[ko.n _s -i.-m-u]	[ko.n _s -i.-m-u]	[ko.n _s -i.-m-u]	'enter-IND-2-D'
b.	[u.ma.n _s -i.-m-u]	[u.ma.n _s -i.-m-u]	[u.ma.n _s -i.-m-u]	[u.ma.n _s -i.-m-u]	'sleep-IND-2-D'
c.	—	—	[fa.θu.-tθa.wa]	[fa.θu.-tθa.wa]	'spine-fish'
d.	—	—	[tθa.θηθ.-na.mθn]	[tθa.θηθ.-na.mθn]	'finger-foot'
e.	—	—	—	[ma.wi.θa.-tθe]	'woods-person'
f.	—	—	—	[a.tθa.waθ.-ru.ka]	'hen-house'

Table 24: Stem final stress in verbs (stem=s) and first PRWD-stress in compounds

For disyllabic nouns, although word-initial stress would have been the rule at Stage I, by Stage II the switch to moraic trochees left only monosyllables and vowel-final disyllables as stress-initial. In formal speeches, this proportion would have been further reduced by phrase-final disyllables, which would have had final stress regardless of this syllable's structure. In Stage III, Lenz's data appears to show the same pattern. Finally, by Stage IV, the alternation has become much more widespread, leaving the cases of disyllables with initial stress as much more of a rarity.

For adjectives, adverbs, determiners and pronouns we have no explicit data for the early stages. In Febrés (1765: 8), the formal speech data never places one of these word categories in phrase-final position, so there is no evidence for stress shifting at Stage II. However, by Stage III the marking of final stress on disyllables within these word-categories is practically exceptionless (when stress is marked at all). This pattern seems well established in Stage IV as well, where penultimate stress is very rare. In other words, here the final-stress pattern seems to have moved forward more quickly and to have ultimately become more pervasive than in nouns, which still show a fair amount of alternation today (see Table 19).

As a result of the processes outlined in this section, by Stage IV, stems and words appear to dependably be stressed on a first syllable only if they are monosyllabic. The fact that trisyllables in the initial position of compounds are not invariably stress-final, following the moraic trochee pattern, points to the issue no longer being just of preference for the final syllable but rather for actively avoiding the initial one (i.e. initial syllable extrametricality, as suggested in Molineaux 2014).

²⁶ We leave aside the issue of headedness and the level of stress of each element in comparison to the other.

Although the data for final stress in the first element in compounds does not stretch back far enough, it is possible to see the stress-final pattern in verb-stems as far back as we have records of the language. In this sense it is not unlikely that the model for stems (and possibly for the first element in compounds) may have spread to other monomorphemic forms in context. The utterance-final rise in formal speech may have been the first possible context for this spreading, which moved relatively quickly across to all non-verbal disyllables. Such a pattern is likely to have been facilitated by the polysynthetic nature of Mapudungun, whereby the difference between word and morpheme boundaries are less absolute, a fact that is supported by the gradient nature of culminativity across stages of the language.

3.5 The context of change

Adalberto Salas, writing two decades ago, tells us that ‘the effects of systematic, continuous contact with Spanish are displayed at all levels of today’s Mapuche language’ (1992:28-9). Evidently, this includes lexical borrowings at a massive scale, alongside a non-trivial amount of function words, as well as morphosyntactic adaptations including the development of an article system, the reduction of nominal incorporation and the reduction in use of the inverse agreement system (Zúñiga 2006b,a).

Much of the content words relevant to the changes in the Mapuche lifestyle during the conquest (agriculture, sheep-herding, war, and governance) were borrowed early and most likely with little direct contact with Spanish speakers among the general populace. As a result, it is highly doubtful that such words would have been incorporated into Mapudungun following the Spanish stress patterns. It is clear that for segmental patterns, the borrowings of this period tended to transpose the Spanish inventory onto the Mapudungun one, adding no non-native patterns (cf. Hasler & Soto 2012). Although the early grammars give us no evidence for the stress patterns, we assume borrowings would have been adapted to the native system, as is the case, for the most part, even today.

As a result, we assume that the change in the basic foot pattern between Stage I and Stage II cannot simply be attributed to contact conditions, but must be the result of language internal factors such as those suggested in §3.1. Even though the moraic-trochee pattern is precisely that of unmarked words in Spanish (cf. Harris 1996), it seems doubtful that these patterns would have kicked off the change, even if they may have helped reinforce it later on.

An interesting possibility is that the preservation of stress-initial disyllabic nouns, as well as the percept of ‘correctness’ for these forms, may be bolstered by Spanish bilingualism at Stage IV. In other words, although we would expect the tendency we see in the peripheral word categories — stressing final vowels in disyllables — to spread to nouns in all syntactic positions, this does not seem to be occurring at the same rate. In the context of practically universal Spanish bilingualism, this seems less surprising, as speakers would have abundant data from new borrowings and from a parallel phonological module to assume that the penultimate mora continues to be the correct position for stress, and to apply a post lexical rule to these at the right edge of the phrase.

3.6 Preservation vs. change

Although here we have focused predominantly on reconstructing the major stress-related changes that have taken place in the 400 years of documented Mapudungun, at least as important as these are the elements that have avoided change in the same period. To this effect there are three persistent traits of the prosodic system that must be highlighted.

3.6.1 End-rule right

Throughout the language’s attested history, the right edge of a prosodic domain seems to be the locus of alignment for feet (or syllables, in the cases where we have stipulated morphologically determined stress). This applies both to verbs, and to simplex and complex nouns. Clearly, the question of whether it is the absolute final syllable that is stressed or the head of a right-aligned trochee (syllabic at Stage I, moraic later) is one that causes important noise in the data, especially for disyllabic nouns. However, our global assessment of each one of the different cross-sections we have obtained for the language shows the general pattern to be one of right-alignment. In this sense, our account differs from the most influential contemporary one: Echeverría & Contreras (1965), which has been taken to show that feet align to the left edge of words.

3.6.2 Left-headed feet

Another fundamental difference we find with the standard interpretation of Mapudungun stress as presented in Echeverría & Contreras (1965) relates to the headedness of feet. Throughout the four stages we report on here, it appears that the basic foot-structure of the language is trochaic. The exceptions to this rule are context and register-bound in nouns,

and circumscribed to peripheral word categories elsewhere. In verbs, although occasionally the right-aligned trochee may be demoted in favour of stem-stress, a final open syllable is never stressed.

As in the case of end-rule right, the influence of the incoming language presents no conflict, the default stress pattern being clearly trochaic as well (in this case moraic). Furthermore, especially in the case of the spreading of final-vowel stress in disyllabic nouns at Stage IV, it may be the case that widespread bilingualism actually prevents the shift, reinforcing the penultimate mora as the locus of stress.

3.6.3 Stress as stem-edge demarcation

Another persistent prosodic feature we present here is that of sub-lexical domains aligning stress to the right edge. Although Spanish, the incoming language, does show features of stress following sub-lexical morphological domains (cf. Roca 2005 for non-verbs and Oltra-Massuet & Arregi 2005 for verbs, among others), this marking does not show the same type of interaction with an independent word-level stress assignment system, as in Mapudungun. In the Amerindian language, stress appears to consistently mark a stem-final syllable (or foot in Stage IV). Where the confluence of penultimate mora stress and stem-final stress (defined as the PRWD minus OFI suffixes) becomes practically exceptionless (at Stage II) the domain of the stem stress is re-defined (apparently as the root-morpheme alone) in order not to be conflated with the word-edge stress and to continue to highlight the morphological structure of the word.

The fact that attested Mapudungun has tended to preserve the boundary marking within complex nouns and verbs gives further grounding to the contemporary claims for demarcative stress. Ultimately, this feature also reinforces the diachronic pattern by which stress is subordinate to morphological structure, rather than the opposite, (cf. Molineaux 2014).

4 Summary and conclusions: *Polysynthesis and domain pertinacity*

This paper has examined most known evidence for the phonological system of Mapudungun up to the early twentieth century, and ventured a plausible set of rules for stress assignment at three distinct stages. It is, of course, difficult to ascertain whether the differences between the sets of data are an artefact of the methods for data-gathering and the perception of the researchers involved, or whether they are actual historical differences. Unless there are contradictions in the data from the same period, we have taken the grammarians' reports at face value.

Considering the historical data, as well as our own sources for PDM we assessed the commonalities and differences between the four outlined stages, attempting a diachronic view of the relation of stress and morphological structure.

The major changes we identified in the language occur early in the recorded history, when relations between Spaniards and the natives were less fluid, and are therefore unlikely to be contact-induced. Two of these changes were the development of weight-sensitivity and the re-definition of the domain of the stem. Both of these processes appear to be related to the disambiguation of the partial conflation of stem and word-level stress assignment. The third change – lexicalisation and stressing of epenthetic vowels – seems slightly later, as it is first attested at Stage III. Here, the process seems to be most robust where the morphological structure of the words is less transparent.

Finally, the shift of stress from the first to the second syllable of vowel-final disyllables in non-verbs appears to be a phrase-final phenomenon, and is attested starting at Stage II. By Stage IV, however, the pattern seems to have become predominant in words in context. Here, we have suggested that Spanish foot structure may well have contributed to the preservation of the stress-initial pattern in nouns.

The demarcative function of stress in Mapudungun, and its pertinacity (cf. Dresher & Lahiri 2003) across the four stages of the language, is one of the more interesting findings in both the synchronic and diachronic data presented in the preceding chapters. If we, furthermore, take into account the polysynthetic nature of the language, the motivations for this type of phenomenon become more transparent. If the ideal polysynthetic language has single words as full sentences — as is no doubt possible for Mapudungun —, word-stress may have more features of the phrasal type and less of the word-type. As a result, it seems that Mapudungun places a greater value on demarcation (which is typically a phenomenon related to the phrasal level), than on culminativity (which tends to apply within the PRWD).

The issue of lack of clear culminativity is present in the PDM literature overall, where we find alternation between the different grammars as regards the preponderance of stem vs. word level stress. This is perhaps clearest in Smeets's claim that there may be two main stresses in longer words (Smeets 2008: 64). The fact that our own data at Stage IV finds the same lack of clear culminativity at the morphosyntactic word level, points to a deep-seated tendency — most likely related to the language's morphological type — for sacrificing culminativity and rhythmic structure in order to highlight the morphological structure of words. From

a diachronic perspective, this is particularly interesting since Sala's claim that 'a high degree of resistance to change may be seen as an overall, prominent feature of the Mapuche language' (1991: 166). While this seems to hold for segmental and morphological change, prosodic structures seems ever-ready to change in patterns that preserve and highlight morphological structure.

Acknowledgements

Many thanks to Aditi Lahiri, Philomen Probert, Stephen Parkinson and Elan Dresher for comments on previous versions of this paper. All errors of fact or analysis, of course, are my own.

Associated material

The key historical Mapudungun texts surveyed in this paper can be accessed at <https://benmolineaux.github.io/>

Author's contact details

Benjamin J. Molineaux

The Angus McIntosh Centre for Historical Linguistics,
School of Philosophy, Psychology and Language Sciences,
The University of Edinburgh
Dugald Stewart Building, 3 Charles Street,
Edinburgh, EH8 9AD, Scotland, UK
benjamin.molineaux@ed.ac.uk

References

- Adelaar, Willem F. H. 1997. Las transiciones en la tradición gramatical hispanoamericana: Historia de un modelo descriptivo gramatical hispanoamericano. In K. Zimmermann (ed.), *La descripción de las lenguas amerindias en la época colonial*, 259–270. Madrid: Iberoamericana.
- Augusta, Félix José. 1903. *Gramática araucana*. Valdivia: Imprenta Central J. Lampert.
- Augusta, Félix José. 1910. *Lecturas araucanas*. Primera. Padre Las Casas: Editorial San Francisco.
- Augusta, Félix José. 1916. *Diccionario araucano-español y español-araucano*. Santiago: Imprenta Universitaria.

- Baker, Mark C. 2003. On the loci of agreement: inversion constructions in Mapudungun. Unpublished Ms. Rutgers University. www.rci.rutgers.edu/~mabaker/mapuche-inversion.pdf.
- Baker, Mark C. & Roberto Fasola. 2009. Araucanian: Mapudungun. In R. Lieber & P. Stekauer (eds.), *The Oxford handbook of compounding*, 594–608. Oxford: Oxford University Press.
- Campbell, Lyle. 1997. *American Indian languages: the historical linguistics of Native America*. New York, NY: Oxford University Press.
- Catrileo, Maria. 1995. *Diccionario lingüístico-etnográfico de la lengua mapuche*. Santiago: Editorial Andrés Bello.
- Croese, Robert. 1989. Evidencias léxicas y gramaticales para una posible filiación del mapudungun con la familia arawak. In R. Cerrón-Palomino & G. Solís Fonseca (eds.), *Temas de lingüística amerindia. primer congreso nacional de investigaciones lingüístico-filológicas*. 275–290. Lima.
- Croese, Robert. 1991. Evidencias léxicas y gramaticales para una posible filiación del mapudungun con la macro-familia arawaka. *Revista Latinoamericana de Estudios Etnolingüísticos* 6. 283–296.
- de Lacy, Paul. 2014. Evidence for stress systems. In Harry van der Hulst (ed.), *Word stress: Theoretical and typological issues*, 149–193. in press. Cambridge: Cambridge University Press.
- Díaz-Fernández, Antonio. 2011. Relaciones genéticas del mapuzungun: aportes para su ubicación dentro del stock equatorial. In Antonio Díaz Fernández & Ana Fernández Garay (eds.), *Investigaciones sobre lenguas indígenas sudamericanas*, 69–114. Santa Rosa: Universidad Nacional de La Pampa. Facultad de Ciencias Humanas. Instituto de Lingüística.
- Dresher, Elan B. & Aditi Lahiri. 2003. Main stress left in Early Middle English. In Michael Fortescue, Eva Skafte, Jens Erik Mogensen & Lene Schøsler (eds.), *Historical linguistics 2003*, 75–85. Amsterdam: John Benjamins.
- Echeverría, Sergio Max. 1964. Descripción fonológica del mapuche actual. *Boletín del Instituto de Filología de la Universidad de Chile* 25. 13–59.
- Echeverría, Sergio Max & Heles Contreras. 1965. Araucanian phonemics. *International Journal of American Linguistics* 31(2). 132–135.
- Englert de Dillingen, Sebastian. 1936. Lengua y literatura araucanas. *Anales de la Facultad de Filosofía y Educación de la Universidad de Chile* 1(2-3). 62–109.
- Febrés, Andrés. 1765. *Arte de la lengua general del Reyno de Chile*. Lima.
- Goedemans, Rob, Jeffrey Heinz & Harry van der Hulst. 2014. *StressTyp2*.

- Gordon, Matthew. 2002. A factorial typology of quantity insensitive stress. *Natural Language and Linguistic Theory* 20. 491–552.
- Gordon, Matthew. 2011. Stress systems. In John Goldsmith, Jason Riggle & Alan C. L. Yu (eds.), *The handbook of phonological theory*, chap. 5, 141–163. Oxford: Wiley-Blackwell.
- Greenberg, Joseph. 1978. *Language in the americas*. Stanford, CA: Stanford University Press.
- Hamp, Eric P. 1971. On Mayan-Araucanian comparative philology. *International Journal of American Linguistics* 37(3). 156–159.
- Harmelink, Bryan. 1987. The uses and functions of ‘mew’ in Mapudungun. *Lenguas Modernas* 14. 173–178.
- Harris, James W. 1996. Projection and edge marking in the computation of stress in Spanish. In John Goldsmith (ed.), *The handbook of phonological theory*, 867–887. Oxford: Blackwell.
- Hasler, Felipe & Guillermo Soto. 2012. Determinación de algunas propiedades del subsistema consonántico del mapudungun y el del español de Chile en los siglos XVI y XVII a partir de los hispanismos léxicos. In Hebe A. González & Beatriz Gualdieri (eds.), *Lenguas indígenas de América del Sur*, vol. I Fonología y léxico (Volúmenes temáticos de la Sociedad Argentina de Lingüística), 92–102. Mendoza, Argentina: Editorial de la Facultad de Filosofía y Letras de la Universidad Nacional de Cuyo.
- Havestadt, Bernhard. 1777. *Chilidugú: sieve tractatus linguæ chilensis*. Leipzig: Treubner.
- Hayes, Bruce. 1995. *Metrical stress theory*. Chicago: University of Chicago Press.
- Hermans, Ben. 2011. The representation of word stress. In Marc van Oostendorp, Colin Ewen, Elizabeth Hume & Keren Rice (eds.), *Blackwell companion to phonology*, vol. 2, chap. 41, 1003–1026. Malden, MA: Wiley-Blackwell.
- Hung, Henrietta. 1993. Iambicity, rhythm and non-parsing. Brandeis University, Waltham, Mass.
- Hung, Henrietta. 1994. *The rhythmic and prosodic organization of edge constituents*. Waltham, MA: Brandeis University. dissertation.
- Hyde, Brett. 2002. A restrictive theory of metrical stress. *Phonology* 19. 313–339.
- Hyde, Brett. 2011. The Iambic-Trochaic Law. In Harry van der Hulst, Colin Ewen, Elizabeth Hume & Karen Rice (eds.), *A companion to phonology*, 1052–1077. Oxford: Oxford University Press.

- Hyman, Larry. 1977. On the nature of linguistic stress. In Larry Hyman (ed.), *Studies in stress and accent*, vol. SCOPIL 4, 37–82. University of Southern California.
- Kager, René. 1993. Alternatives to the Iambic-Trochaic Law. *Natural Language and Linguistic Theory* 11. 381–432.
- Kager, René. 2007. Feet and metrical stress. In Paul de Lacy (ed.), *The Cambridge companion to phonology*, 195–227. Cambridge: Cambridge University Press.
- Kenstowicz, Michael. 1994. *Phonology in generative grammar*. Oxford: Blackwell.
- Key, Mary Ritchie. 1978. Araucanian genetic relationships. *International Journal of American Linguistics* 44(4). 289–293.
- Key, Mary Ritchie. 1981. North and South American linguistic connections. *La Linguistique* 17(1). 3–18.
- Lenz, Rodolfo. 1893. Beitrage zur Kenntnis des Amerikanospanischen. *Zeitschrift fuer Romanische Philologie* 17. 188–214.
- Lenz, Rodolfo. 1895-1897. *Estudios araucanos*. Vol. XCVII. Santiago: Anales de la Universidad de Chile.
- Loos, Eugene. 1973. Algunas implicaciones de la reconstrucción de un fragmento de la gramática del proto-pano. In *Estudios panos ii* (Lingüística Peruana 11), 263–282. Yarinacocha, Peru.
- Martínez-Paricio, Violeta & René Kager. 2015. The binary-to-ternary rhythmic continuum in stress typology: Layered feet and non-intervention constraints. *Phonology* 32(03). 459–504.
- McGarrrity, Laura. 2003. *Constraints on patterns of primary and secondary stress*. Indiana University dissertation.
- Molineaux, Benjamin J. 2014. *Synchronic and diachronic morphoprosody: evidence from Mapudungun and Early English*. Oxford: The University of Oxford dissertation.
- Molineaux, Benjamin J. 2016a. Native and non-native perception of stress in Mapudungun: Assessing structural maintenance in the phonology of an endangered language. *Language and Speech*. online first.
- Molineaux, Benjamin J. 2016b. *Rhythmic vs. demarcational stress in Mapudungun*. Presented at the 24th Manchester Phonology Meeting (24mfm), The University of Manchester, May 26-28 2016. http://www.homepages.ed.ac.uk/bmolinea/Papers_files-/24MFM.pdf.
- Molineaux, Benjamin J. 2016c. Vigencia del *Diccionario Araucano* de Félix de Augusta a cien años de su publicación. *Boletín de Filología* LI(1). 187–209.

- Olivares, Luis de. 2005. *Los jesuitas en la Patagonia: Las misiones en la Araucanía y el Nahuelhuapi (1593-1796)*. Santiago: Corriente.
- Oltra-Massuet, Isabel & Karlos Arregi. 2005. Stress-by-structure in Spanish. *Linguistic Inquiry* 36(1). 43–84.
- Payne, David L. 1984. Sobre el desarrollo histórico de los sufijos de referencia cruzada del mapudungun. In *Actas jornada de lenguas y literatura mapuche*. Vol. 5, 1–17. Temuco.
- Rivano, Emilio. 1989. Persons, interactions, proximity and metaphorical grammaticalization in Mapudungu. *Lund University Department of Linguistics Working Papers* 35. 149–168.
- Rivano, Emilio. 1990. Notes on the feature matrix for Mapudungun vowels and related issues. *Revista de Lingüística Teórica y Aplicada* 28. 135–145.
- Roca, Iggy. 2005. Saturation of parameter setting in Spanish stress. *Phonology* 22(3). 345–394.
- Sadowsky, Scott, Héctor Painequeo, Gastón Salamanca & Heriberto Avelino. 2013. Mapudungun. *Journal of the International Phonetic Association: Illustration of the IPA* 43(1). 87–96.
- Salas, Adalberto. 1976. Esbozo fonológico del mapuθuñu, lengua de los mapuche o araucanos de Chile central. *Estudios Filológicos* 11. 143–153.
- Salas, Adalberto. 1985. Fray Félix José de Augusta: su aporte a los estudios de la lengua y la cultura de los mapuches o araucanos. *Cultura, Hombre, Sociedad (CUHSO)* 2(2). 197–272.
- Salas, Adalberto. 1991. The minimal finite verbal paradigm in Mapuche or Araucanian at the end of the sixteenth century. In Mary Ritchie Kay (ed.), *Language change in south american indian languages*, 166–177. Philadelphia: University of Pennsylvania Press.
- Salas, Adalberto. 1992. *El mapuche o araucano*. Madrid: MAPFRE.
- Salas, Adalberto. 2003. Lingüística mapuche, guía bibliográfica. Biblioteca Virtual Universal www.biblioteca.org.ar/libros/8854.pdf.
- Salas, Adalberto. 2006. *El mapuche o araucano*. Santiago: Centro de Estudios Públicos (CEP).
- Smeets, Ineke. 2008. *A grammar of Mapuche*. Berlin: Mouton de Gruyter.
- Soto, Guillermo & Felipe Hasler. 2010. La no vigencia en el momento de habla: sobre la posibilidad del anti-perfecto como categoría gramatical. In M. Castel & Liliana Cubo de Severino (eds.), *La renovación de la palabra en el bicentenario de la argentina. los colores de la mirada lingüística*, 1265–1271. Editorial FFyL UNCuyo.
- Stark, Lousa R. 1970. Mayan afinites with Araucanian. In *Papers from the sixth general meeting of the chicago linguistics society*, 56–69. Chicago.

- Suárez, Jorge. 1959. The phonemes of an Araucanian dialect. *International Journal of American Linguistics* 25. 177–181.
- Tesar, Bruce. 2004. Using inconsistency detection to overcome structural ambiguity in language learning. *Linguistic Inquiry* 35(2). 219–253.
- Toribio Medina, José. 1894. Noticia biográfica. In Fr. Luis de Valdivia (ed.), *Doctrina cristiana y catecismo con un confesionario, arte y vocabulario breves en lengua allntiac*, 1–42. Imprenta de E. Rasco.
- Valdivia, Luis de. 1606. *Arte, y gramatica general de la lengua que corre en todo el Reyno de Chile, con un vocabulario y confesionario*. Seville: Tomás López de Haro.
- Valdivia, Luis de. 1621. *Sermón en la lengua de Chile, de los misterios de nuestra fé catholica, para predicarla a los indios infieles del Reyno de Chile, dividido en nueve partes pequeñas de acuerdo a su capacidad*. Valladolid.
- Zúñiga, Fernando. 2006a. Mapudungan. In Keith Brown (ed.), *Encyclopedia of language and linguistics*, 487–488. Oxford: Elsevier.
- Zúñiga, Fernando. 2006b. *Mapudungun: El habla mapuche*. Santiago: Centro de Estudios Públicos.
- Zwartjes, Otto. 2000. Modo, tiempo y aspecto en las gramáticas de las lenguas mapuche, millcayac, y guaraní de Luis de Valdivia y Antonio Ruiz de Montoya: La categoría de los tiempos mixtos. In Otto Zwartjes (ed.), *Las gramáticas misioneras de tradición hispánica (Siglos XVI–XVII)*, 205–256. Amsterdam/Atlanta GA: Rodopi.